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Railway Shopmen's Pay Settlement

RELIEF that the strike of British Railways shopmen has been called off by the National Union of Railwaymen must be tempered by realisation that the additional payments will add about £2,250,000 a year to the outgoings of the British Transport Commission, which already is incurring a deficit on the working of the railways. The Commission has shown great patience in negotiation with the unions concerned, the Confederation of Shipbuilding & Engineering Unions, and the National Union of Railwaymen. When talks in private were resumed last Friday the Chairman of the Commission, Sir Brian Robertson, urged that the problem of the rate of pay for skilled grades, which the parties had found it impossible to settle between themselves, should be put to the Industrial Court or to an arbitrator; and the Commission suggested some eminent men who might be asked to act as umpire. At the meeting on Monday, however, certain proposals were made by the unions, and it was plain that the gap between the parties was insufficient to justify a national dispute with very serious effects on the national economy and on the future of British Railways. After long discussion a settlement was reached, of which details are on page 460. The position of railway shopmen in relation to men employed on similar work in other industries now seems to be not unfavourable, when the stability and other advantages of railway work are taken into account. Most of the skilled men will be paid a new basic rate of £10 2s. with effect from January 11 of this year; this is 18s. 6d. higher than the rate paid at the beginning of this year before the shopmen were given a 5 per cent increase. At the other end of the scale, labourers and unskilled workers are to have a basic weekly rate of £8 8s. 6d., which is 13s. more than their wage before the 5 per cent increase, and affords an immediate advance of 5s. The N.U.R. executive was hasty in threatening a strike, and has been criticised by leaders of the C.S.E.U.; the fact that wiser counsels prevailed appears to be due largely to the moderation of the General Secretary, Mr. S. F. Greene, and other national officers of the N.U.R.

Too Large for the Roads

THE size of some road vehicles from time to time causes misgivings amongst the public. Now that traffic on nearly all roads is increasing fast, the obstruction caused to other road users by very large vehicles is becoming the subject of increasingly frequent complaints, and demands that such vehicles be banned from the roads—at times of day, in many cases, to suit the complainants. In reply to letters to this effect in *The Times*, Lord Stonham, Chairman of the Road & Rail Association, maintains that apart from what he terms over-large or dangerous loads, there is no need for direction of heavy long-distance traffic from road to rail, but that modernised railway goods services offer an economic and increasingly efficient alternative service. However much roads and railways are improved, he states, the community will only have an efficient transport service when the major users employ each form of transport for the tasks which it is best equipped to carry out. One may wonder how long it will before many who now consign by road realise this.

Small Home Market for Carriage Builders

THE unhappy results of restriction of the home market for manufacturers of railway stock are shown in the results of the Gloucester Railway Carriage & Wagon Co. Ltd. Since nationalisation, British Railways and London Transport Executive have been virtually the only customers in this country of manufacturers of rolling stock, and because British Railways builds most of its own carriages and wagons the home market is further reduced. This is stated by General Sir William Morgan, Chairman of the company, to be one reason for the drop in the group net profit from £206,952 for 1958-59 to £143,403 for the year ended May 31 last. The scramble for such work as is offered has resulted, he points out, in price-cutting competition and, in the case of his company, acceptance of work at uneconomic prices to avoid wholesale reduction in the labour force. A further consequence is restriction of the ability of British manufacturers to compete successfully in markets overseas. The scope for trials of new designs, materials, and methods of construction is limited, as is the length of production runs which help to reduce costs. Because of the failure to obtain orders to keep the Gloucester carriage and wagon works filled "to more than a fraction of their capacity" the directors feel that they can no longer depend on building carriages and wagons as the firm's chief business, and other lines of manufacture are sought. That is an irony of fate in the year in which the company has celebrated its centenary.

Youth at the Helm in Ireland

FEW transport managements can have appointed simultaneously six officers as young as the five Area Managers and one Deputy Area Manager of Coras Iompair Eireann whose names are recorded in our personal pages. The ages of Messrs. C. F. Clune, L. Dunne, J. F. Higgins, P. Murphy, and W. A. O'Neill, appointed Area Managers with headquarters respectively in Dublin, Cork, Limerick, Galway, and Waterford, are only 37, 32, 30, 37, and 31, and Mr. K. G. Brady, Deputy Manager, Dublin, and the oldest of them, is 38. It is clear that Dr. C. S. Andrews, Chairman, and the other members of the Board of C.I.E. intend to give younger men every chance to help to re-invigorate public transport in the

Republic of Ireland. Each Area Manager is to have a large measure of autonomy. He will be assisted by a small staff of specialists in civil engineering, operating, commercial, accountancy, staff and welfare and other fields of activity. As C.I.E. embraces lines of the former Great Southern & Western, Great Northern, Midland Great Western, Dublin & South Eastern, Cork, Bandon & South Coast, and other smaller railways, the areas do not correspond to sub-divisions of the old railways—apart from their responsibility for road transport. The six newly-appointed officers are undergoing special training at the C.I.E. head office in Dublin and at other centres, and they will receive training on the Continent before taking up their duties in a few months' time.

Training for Production

TRAINING offers the greatest opportunity for increasing productivity, according to Mr. J. P. de C. Meade, Head of the Training Advisory Service, Industrial Training Council, in his paper on training young workers, given on Wednesday to the National Conference of the British Institute of Management at Harrogate. The approaching "bulge" in school leavers, he maintains, should be regarded as a fortuitous opportunity for increasing productivity by training: every company is involved in training whether it knows it or not. Systematic training means planned learning by experience, supplemented by instruction on the job with further education. and it requires trainers to be trained, supervision of training by a manager, and adequate selection procedures. Many work-people, he states, are expected to pick up the knowledge and skills they need; in so doing they pick up the bad habits of those they copy, besides the good, and they may cease to make efforts. The result is often a high, costly labour turnover of recent recruits or a body of barely satisfactory workers who may, moreover, judge the firm by its casual attitude to its employees. Whilst there are many five-year and other comprehensive schemes for training apprentices, Mr. Meade points out, organised training of semi-skilled or unskilled workers is rare. But many employers now are giving these problems very close attention.

Growing Trade with the Continent

ONE of the most significant developments in world trade in recent years has been the extent to which trade between the industrial countries has grown faster than trade between the industrial countries on the one hand and the primary producers on the other. This was pointed out last week by the President of the Board of Trade, Mr. Reginald Maudling, at the Chamber of Shipping Dinner at Grosvenor House, London, W.1. He believes that the trend is likely to continue. The emphasis in international trade is increasingly on articles of greater value and less bulk. There is also a greater increase in activity in the short hauls, for example, between the countries of Western Europe. Whatever may be the consequencies of this for the British shipping industry in general, the outlook for freight between Britain and the Continent, in which British Railways and its associates play an important part, is hopeful. They are active in providing speedy and reliable services by passenger and cargo ships and wagon ferries. Future developments of these services will depend much on the decision of the British and French Governments on the building of the Channel Tunnel.

Improved Facilities for Perishable Traffic

THERE is little doubt that the Continental perishable traffic depot built by the Southern Region of British Railways at Hither Green will have a marked effect on the quick handling of Continental produce. This type of traffic is showing a rapid increase as more and more traders use the Regions fast train ferry services. Until the new depot was opened earlier this month, this highly-perishable traffic, mainly fruit, flowers and vegetables, had been handled at Southwark Depot with no warehouse accommodation and no siding facilities for stabling and sorting wagons. This meant that when the wagons had been unloaded they had to be sent to Bricklayers Arms for sorting, and that at peak periods some incoming wagons had to be stabled at stations along the route before going into Southwark or diverted for unloading to Battersea Wharf, where it was necessary to provide extra staff. Many wagons were cleared by customs at Dover which sometimes meant a delay. Special arrangements for customs clearance and re-forwarding of wagons to stations outside London are a feature which will prove of inestimable value to provincial markets.

Large-Scale Aluminium Production

UNTIL recently 7 ft. was the greatest width of aluminium plate which could be rolled at Rogerstone Works, near Newport, Monmouthshire, for the manufacture of railway rolling stock, for shipbuilding, and for petroleum and chemical plant. Therefore, because of the increased cost of making joints by welding or riveting, manufacturers had not the same freedom of design available as with steel construction. Completion of the first half of an £8,000,000 expansion scheme started in 1958 by the Northern Aluminium Co. Ltd. (now Alcan Industries Limited), has brought into use at Rogerstone the largest and most powerful mill operating in Europe for rolling aluminium. This is a 144-in. four-high hot mill capable of producing plate up to 11 ft. wide. It will be used also as a breaking-down mill in the hot line for increasing the output of sheet and strip. An illustration appears on page 460. With this and other new plant, the nominal capacity of the works is being increased by 50 per cent to about 75,000 tons of aluminium products a year; the ultimate annual capacity may be as much as 175,000 tons.

Publicising Electrification Progress

A GOOD deal of literature explaining major works in progress or planned and giving reasons for the delays caused is handed nowadays to the travelling public by Regions of British Railways. Amongst the best of these publications are two editions of *Electrification News* distributed recently to passengers by the Colchester main line of the Great Eastern Line, Eastern Region. They are the subject of brief notice on page 445. Accounts are given of the civil engineering implications of a.c. electrification. These news-sheets bear the words "Closing the Gap," which refer to a.c. electrification between Chelmsford and Colchester. The two editions are identical, except that the Traffic Manager, Liverpool Street, Mr. H. W. Few, contributes a message to one, and his colleague at Norwich, Mr. G. G. Goodings, to the other. The magnitude of the task of a.c. electrification is understood by few people, and these news-sheets will surprise many, and increase sympathy with efforts to ensure punctuality.

Glasgow Suburban Electric Services

THE benefits to the travelling public of a.c. electrification of the Glasgow suburban lines of British Railways, Scottish Region, north of the Clyde are shown in the timetable for the Helensburgh–Airdrie line which comes into force on November 7. It will provide on weekdays two trains an hour between Helensburgh and Airdrie; Balloch and Bridgeton; Dalmuir Park and Airdrie; and Milngavie and Springburn. The effect of this is a build-up in frequency approaching Glasgow. For example, from the west, two trains hourly from Balloch *plus* trains hourly from Helensburgh give four trains hourly from Dumbarton ; there will be six trains hourly from Dalmuir Park, and eight through Glasgow Queen Street Low Level. The interval services running throughout the day will be supplemented during the morning and evening peak hours. The new train sets built by the Pressed Steel Co. Ltd. will run about 43,000 miles a week. The 11 steam trains a day from Balloch to Glasgow will be replaced by 35 electric trains; and the typical steam train journey time of 60 min. from Balloch to Queen Street is to be reduced to 45 min. The Airdrie branch will be even better served, with its 25 steam trains daily increased to 75.

Marshalling Yard near Auckland N.Z.G.R.

MAJOR works being carried out by the 3-ft. 6-in. gauge New Zealand Government Railways to shorten transit times for freight and to reduce operating costs include the marshalling yard at Westfield, Auckland. This is expected to be in use by the end of 1961. It is being built on some 25 acres of land reclaimed from Manakau Harbour. The main

yard, with seven miles of track, is finished, and construction of about seven miles of subsidiary track is well in hand. Plans for a three-storey administration block are well advanced and it is expected that tenders for the building will be called before the end of this year. Other tasks to be completed include a fuelling and servicing depot for diesel shunting locomotives, a small wagon repair depot, and flood-lighting towers. The types of retarders and other equipment have not been announced. The capacity will be 1,900 wagons.

Servicing and Replacement of Swiss Passenger Stock

SWISS railways have been prompt to take advantage of the progress made by manufacturers in developing durable and relatively inexpensive counter instruments. The Swiss Federal Railways is now fitting passenger coaches and vans with kilometrage recorders. This enables vehicles to be overhauled after running a certain distance instead of after a prescribed period of time. One result is reported to have been a reduction of 25 per cent in the amount of overhauls. It is not stated how long it will be before all vehicles are so equipped. In contrast to the modern bogie stock used in light-weight high-speed and other trains, there are still many three- and two-axle coaches and vans running in some secondary services; many are of excellent workmanship, and the riding is smooth. Their number has been reduced from some 1,500 to 600 in the past four years.

Promoting the Science of Transport

COMPLETION in 1959 of 40 years of life by the Institute of Transport is the occasion of a review of its aims and of the success in achieving them, in the Presidential address given last Monday by Mr. K. W. C. Grand, Member of the British Transport Commission and formerly General Manager of the Western Region, British Railways. The main objects of the Institute, as set out in its Royal Charter, are: "To promote, encourage and co-ordinate the study of the science and art of transport in all its branches." For 40 years less attention has been given, in his opinion, to the science than to the art of transport, that is to say, to the skills and techniques needed for management and operation of each separate mode of transport. The new President hopes to see increasing emphasis on the science of transport, both pure and applied. Pure science he defines as that pursued for its own sake ; his definition of the applied science of transport is "an analysis of all forms of transport to determine how each form may best be used, separately and in combination in the interest of the public and the nation."

The science of transport, he emphasises, has to pay attention to items such as efficiency, measured by output in relation to cost, and not merely financial cost, which can depend on who pays for track and terminals, and how they pay, but real cost in human and material resources; to cost per unit of transport and cost per unit carried, two very different things, the second being governed by the load factor; to the extent of the demand for safety, speed, punctuality, regularity, and reliability; and to the effect of that demand on supply and on cost. This network of interacting relationships can alter with each technological advance. All these items apply to transport of any kind, and to transport anywhere on the globe. In this connection transport history is important, for facts can mislead if studied without the backgrounds which gave rise to them. Mr. Grand welcomed the decision, early this year, to include transport history in the Institute examination schemes.

As to fufilling its purpose, the Institute, with a membership of 10,000, does not, he considers, receive enough lead from the top. Although some leaders in the transport industry refer to the value to younger men of membership of the Institute, he wonders whether encouragement to join the Institute and pass its examinations is always given, whether near-superiors discourage such efforts, or whether the passing of Institute examinations is recognised as an important qualification for promotion, though specialists should be given the encouragement to qualify in their particular field, such as civil engineering, law, or accounting. Membership of the Institute of Transport, he observes, is not yet, as a professional qualification, on the same footing, as that of the technical institutes. Perhaps, he adds, it never will be, but one may ask why.

Intellectually the Institute is strong, with contributions in time and effort from senior men in the industry as Members of Council and as officers of other bodies and as writers of papers and participants in discussions. It is clear, however, that still more can be done than what is being undertaken at present. Funds do allow " a headlong rush " to promotion of the Institute's main objects. There is scope for development both in the Institute *Journal* and in sponsoring research monographs.

To some extent, Mr. Grand states, the " personality " of the Institute or its standing is greatly in excess of its physical size. This is partly to be attributed to the foresight of the founders who set the Institute on sound lines and who achieved for it the dignity of a Royal Charter within seven years. It is also to be attributed to the calibre of the long line of Presidents and Members of Council who have seen to it that in all the controversial matters which have arisen in transport in the life-time of the Institute, it has never once taken sides but has continued to provide a calm forum for discussion. The quality of the papers presented for discussion and the resultant high quality of the *Journal* have ensured a high place for the Institute not only in the field of transport but in the world outside. In education, too, the liaison of the Institute with the educational authorities everywhere, and the provision of scholarships and grants for study, have enabled it to make a great contribution. The determination to see that the scientific study of transport should not be neglected culminated two years ago in the appointment in the University of Oxford of the first Reader in the Economics Organisation of Transport and also of two Research Fellows.

Managements and occupants of high positions in the transport industry can make young people on the threshold of their careers feel wanted and responsible members of a great profession. Transport is basically a service and one in which so many are called upon to work away from direct supervision. Development of professional standards is essential, if a transport service is to be what it ought to be. This is, in fact, another link between transport and science. But where young people meet the challenge of this career, perhaps unique in the way in which it combines control of men and control of machines, where they educate themselves and show that they can carry responsibility, then they ought to have it. Mr. Grand's remarks on this subject should be pondered by all senior railway officers. " I have long been saddened," he states, " by the deadly slowness of promotion and appalled by that all too familiar remark: ' He's a bit young, isn't he?' It is a scientific fact that men are not equal in their character and talents. We are committed, and rightly committed, to making opportunities as equal as we can. But when the opportunity, the interview, has been given, let us not be afraid of appointing the best man to the job. Seniority is properly taken into account when, in all other respects, men are equal. Where they are not equal then we betray our industry and ourselves if we fail to pick the best and promote the promising youngster, just as fast as he is fit to take it."

The fact that in transport questions of ownership and policy are bound up with politics and inevitably involve those whose livelihood transport is, need have no effect at all on the frame of mind and the care with which they study the problems, or the honesty and impartiality with which they report and discuss the results. Because it is not easy to be impartial, it is all the more necessary to make it possible for much of the basic research to be carried out by those who are not involved in the day-to-day business—by those who are not " committed " and who have been nurtured by their background of education and training in the tradition of detached seeking after truth.

The writing of papers by men in the industry is at the heart of the scientific study of transport. It may not be given to all to produce a major contribution to science, but they are all capable, if they tackle the job honestly, of making a worthwhile contribution to the sum total of knowledge, grist to the scientist's mill. The Government, Mr. Grand believes, should help. Scientific study can proceed only if the facts are available. Some sections of the transport industry, such as the railways, are obliged to publish detailed statistical information, but, generally, the pool of statistical knowledge in Britain compares unfavourably with the U.S.A. Next to nothing is known about road haulage and coastwise shipping. This is largely a matter for the Government, but one may wonder if the leaders of some great enterprises need be so fearful of publishing information.

British Achievements in A.C. Traction

BRITISH Railways Electrification Conference, which closed last week, served a valuable purpose in demonstrating to an international gathering that development of equipment in this country for 50-cycle traction is striking out on lines of its own. Although British Railways has limited experience with the high-voltage a.c. system of electrification, the fact that it can make an impressive contribution in this field was shown by Mr. S. B. Warder, Chief Electrical Engineer, British Railways Central Staff, in his inaugural paper to the conference. He referred to the problem, aggravated by the restricted loading gauge in this country, of obtaining sufficient clearance, to the use of secondary insulation and new insulating materials, to the possibility of reducing air clearances in the near future, and to the dual-voltage 25/6·25kV. system developed for use when the higher voltage is impracticable. These are only a few of the questions that have confronted British Railways since the 50-cycle system was adopted as standard in 1956; and their solution, admirably expounded in subsequent papers, is of inestimable value to overseas railway administrations.

The over-riding consideration which the conference had been convened to demonstrate, was the noteworthy developments in electrical engineering stimulated by a.c. traction, in which British industry and the British Transport Commission are playing a leading part. These developments, and the close co-operation which exists between the Commission and the British electrical and locomotive manufacturing industries, were ably demonstrated at the exhibition of rolling stock and electrification equipment held at Battersea Wharf. The B.T.C. is assiduous in organising exhibitions, but at Battersea the combined efforts of the Locomotive & Allied Manufacturers' Association of Great Britain, the British Electrical & Allied Manufacturers' Association and the Commission, produced a remarkably comprehensive display illustrating British enterprise and achievement. The manufacturers' stands were viewed by delegates with considerable interest. Together they formed a well-arranged shop window for British export trade. The rolling stock display covered the whole field of British Railway a.c. traction, including locomotives and multiple-unit stock. Another aspect of British Railways modernisation was shown in the Southern Region 2,500-h.p. d.c. locomotive. When the Commission adopted the 25-kV. a.c. system as standard, it was decided that the Southern Region third-rail d.c. system should be continued. Notable additions were made to the electrified mileage last year, and work is continuing in the Region with the ultimate aim of eliminating steam entirely.

Apart from the working sessions of the conference, which produced a wealth of discussion on a diversity of subjects, delegates had an opportunity to see a.c. installations for themselves. The visit to the Manchester-Crewe line on October 5, organised by the London Midland Region, elicited praise from many delegates for the traction and signalling equipment shown and for the efficiency of the arrangements made for inspection.

One of the notable features was a demonstration of high-speed running at nearly 100 m.p.h. behind a Type "A" 3,300-h.p. electric locomotive. Riding at these speeds was excellent, which testifies to the hard work put in on the track by the Civil Engineering Department and to the design of the main line bogie stock. While one party was viewing signalling installations at Manchester Piccadilly and at Wilmslow, another travelled to Crewe for a conducted tour of the electric motive power depot. Keen interest was taken in the various items of mechanical plant for erecting overhead equipment assembled outside the depot. Working demonstrations were given of concrete mixing and pouring and auger boring.

The visit to electrified lines of the Eastern Region, in the London suburban area and Essex, on October 7, gave delegates an opportunity to experience working on a heavily-trafficked suburban system. As on the Crewe-Manchester line, the overhead system is basically energised at a nominal pressure of 25 kV.; but at certain points, because of existing limited clearances, it is necessary to reduce the voltage to 6·25 kV. to avoid heavy expenditure on civil engineering work. The tap-changing equipment for selection of correct transformer primary connections, mounted on the underframes of motor coaches, was displayed on a visit to Ilford Electric Train Depot. This building, substantially enlarged last year to meet the requirements of additional suburban electric stock, was the venue for a comprehensive display of multiple-unit electric stock.

The conference was brought to a successful conclusion last Friday evening when B.E.A.M.A. and L.A.M.A. were joint hosts at a banquet to the delegates at Guildhall. Speaking of railway electrification at industrial frequency, Mr. Reginald Maudling, President of the Board of Trade, summed up the general aim of the conference admirably. It was not always a disadvantage, he stated, to go late into a field. It was possible to learn from others and even to benefit from their mistakes.

The achievements and skill of British Railways and the British manufacturing industries may prove to be an inspiration to railway administrations not yet committed to a.c. traction, and the conference could prove to be a landmark in the development of a.c. electrification.

Wanted—a *Chef d'Orchestre*

ONE of the many interesting points which emerged from the Electrification Conference held by the British Transport Commission in London last week was the statement by Mr. E. Vaubourdolle, of the French National Railways, that a large project such as a system-wide electrification should be carried out under the co-ordinating direction of what he described as a *chef d'orchestre*. Mr. Vaubourdolle spoke in reply to Mr. P. R. Dunn, of British Insulated Callender's Cables Limited, who had said that surveys should be carried out well before the commencement of any construction work and, in the case of station areas, up to three years before such commencement.

Mr. Vaubourdolle said that one was always pressed to get an authorised electrification into service as soon as possible so as to realise the economies it would bring. Therefore, a variety of jobs had to be done at the same time, though with a certain priority, and co-ordination was very important. The best solution was to have a *chef d'orchestre*—the term may perhaps be most nearly approximated in English as a Co-ordinating Director—who would have moral, if not formal, authority over all departments concerned. It was very important that, once a plan had been agreed, no alteration whatsoever should be permitted without the authority of the Co-ordinating Director.

At the Conference, it was pointed out to Mr. Vaubourdolle that something of the kind already existed on British Railways—on the London Midland Region, for instance, electrification was co-ordinated under the moral authority of Mr. A. H. Emerson, Electrical Engineer. This is so, but we do not think that Mr. Vaubourdolle had in mind merely regional co-ordination: it is more likely that he was thinking in terms of the organisation that we understand exists on the Indian Railways. Under this, all electrification is planned in stages and responsibility for its implementation is placed in the hands of a General Manager & Chief Engineer (Railway Electrification), with status equivalent to that of General Manager of one of the railway systems.

In July, 1958, Mr. H. D. Awasty, then Director, Civil Engineering, Indian Railway Board, was appointed to the new position. Although Mr. Awasty had had no direct experience of electric traction before his appointment, many of his senior staff had been engaged on the 1,500- or 3,000-V. d.c. electrified railways in the Bombay, Madras, or Calcutta areas. In his present capacity, Mr. Awasty is aided by an Engineer-in-Chief, who in turn has the help of two deputy chief engineers (one each for Designs and Construction), a chief signals and telecommunications engineer, a chief accounts officer, and a consulting engineer. The organisation thus concentrates railway electrification effort in one planning, purchasing and construction team. It is responsible for new work, but not for operation or maintenance subsequent to commissioning. The function of the Operating Superintendents under the Deputy Chief Engineer (Construction) is twofold: (i) to agree with their opposite numbers in the railways the tracks to be equipped and other similar considerations, and (ii) to co-ordinate the arrangements for track possessions for the construction works trains.

During the past 18 months, the organisation has produced some very satisfactory results—more than 100 track-miles have been put in commission by British Insulated Callender's Construction Co. Ltd., and a further 250 miles have been erected by an Italian company. An interesting point which has emerged is that the work of cabling of aerial trunk lines of

the Posts & Telegraphs Department (not under the authority of the Ministry of Railways) is proceeding at a slower rate than the rest of the project. These are all considerations which should appeal particularly to major railway organisations throughout the world, for perfectly planned work and its execution is necessary not only within the railway organisation but also with other bodies such as the Posts & Telegraphs and power authorities.

The Rail/Road Problem in India

UNLIKE many other countries, India hitherto has had no serious problems of rail-and-road competition. This has been due partly to the small mileage of roads on which competitive road services can be provided, and partly to the fact that all main roads are Government property, either Central or State (Provincial). Like so many other factors in India in 1960 the position is changing rapidly. With a remarkable expansion of the road network and with a public inclined to favour road traffic, railways will have to give closer attention to this future menace to their monopoly of traffic.

In 1943 a 20-year all-India road development plan was drawn up, but the war prevented its appreciation by Provincial and other authorities until the new Government considered the matter in 1947. In the light of the new conditions then obtaining, the 1943 plan was revised in 1948, and it then envisaged the completion of a highway network composed of 123,000 miles of surfaced and 208,000 miles of unsurfaced roads. The programmes undertaken during the First (1951-56) Five-year Plan and the Second (1956-61) Plan indicate that both these figures are likely to be exceeded, and that by March, 1961, 144,000 miles of surfaced and over 250,000 of unsurfaced roads will be in service.

Recently the Chief Engineers of the Central and States Governments prepared a further programme for the 20 years, 1961-81. Its targets are 252,000 miles of surfaced and 405,000 miles of unsurfaced roads. There has undoubtedly been greatly increased demand in recent years for district and village roads, and considerable development has taken place under the programmes at District Boards, municipalities, and community development organisations. These demands are continuing with increasing momentum into the Third Five-year Plan period, and are being aided by local contributions mainly in the form of labour. Besides expenditure incurred by these local authorities and bodies the sums involved for road development in the First and Second Five-year Plans were £116,000,000 and £188,000,000 respectively. During these 10 years, 1951-61, the mileage of surfaced roads other than municipal roads will have increased by 50 per cent.

Although road transport is mainly in private hands, there is a provision of £13,500,000 in the Third Five-year Plan for nationalised road transport services, largely passenger. Provision is also being made in the Railway Five-year Plan to contribute to the expansion of nationalised transport in the States. During the period of the plan some 5,000 vehicles will be added to the nationalised road fleet, a figure limited by insufficiency of foreign exchange. The number of commercial vehicles will nearly have doubled between 1951 and 1961 and that of goods vehicles will have increased from 82,000 to 150,000 during this decade.

Current Collection at Speed

IT is not possible in practice to achieve the ideal of absolutely uniform current collection from a static overhead wire traversed by a pantograph mounted on a moving train. The overhead wire varies in rigidity, mainly because of its attachment to supporting structures, but also because of its inertia and unavoidable changes in height above the track. The pantograph, although designed to exert a constant upward pressure, has inertia which prevents an instantaneous reaction and has aerodynamic resistance which makes its characteristics dependent, to some extent, on speed. In consequence, the contact pressure between the two components is continually changing and, for satisfactory operation, it must neither be so low that electrical continuity is lost, with the attendant risk of the establishment of destructive power arcs, nor so high that excessive mechanical wear or damage is caused to the overhead equipment or pantograph.

The problem has been recognised for some time, but it becomes more important as higher supply voltages and, hence, lighter overhead wires are used, and as running speeds increase. Realisation that the progressive development of improved designs depended on the acquisition of accurate data led the British Insulated Callender's Cables Group to investigate the practicability of constructing a scale model which could faithfully reproduce all the dynamic mechanical characteristics of the full-scale equipment, at simulated speeds up to at least 100 m.p.h. This model, housed in a new laboratory at Tolworth, forms a valuable addition to the group's extensive research facilities.

The laboratory, believed to be the only one of its kind in the world, was visited by delegates to British Railways Electrification Conference this month, and was viewed with great interest by overseas engineers currently engaged on a.c. electrification projects. At present the types of overhead equipment which have been designed and are being installed by B.I.C.C. for British Railways are being reproduced so that their characteristics can be fully analysed. The necessary foundation will then have been laid on which improvements or economies can be made.

The models are designed to be both geometrically and dynamically similar to the full-scale system. Geometric similarity implies that all parts of the model shall have the same general shape as corresponding parts of the prototype; that is to say, the scale factor for distances has the same value in the vertical and horizontal directions. For dynamic similarity, scaled-down values of forces occurring in the prototype, when applied to the model, must reproduce geometrically equivalent displacements, or be associated with velocities, accelerations, strains, and so on, in the model which are scaled-down values of the corresponding quantities in the prototype. The forces which act on a full-scale system—gravitational, pantograph pressure, static tension, wind pressure, and friction—cause a displacement of the contact and catenary wires with an acceleration which is determined by the inertial mass of the system and, possibly, travelling or standing waves. The properties of the overhead system which determine the nature and extent of the displacement are the elastic and rigidity constants of the wires, the mass per unit length, and the inertial masses of other component parts of the system which are free to move. All the quantities which are involved, length, mass per unit length, extensibility, flexural rigidity, force, velocity, and acceleration, can be defined in terms of three fundamental quantities, mass, length, and time. Thus, if scaling factors are chosen for these three, the appropriate factors for all other quantities may be calculated by dimensional analysis.

Appropriate values for these factors have to be decided. If the scale factor is too small the model becomes clumsy, while if it is too great, accurate reproduction of pantograph characteristics becomes difficult. Regarding the scaling factor for mass, which is the same as that for force, a desirable value was judged to be about 1,500 lb., at which the pantograph pressure becomes about $\frac{1}{80}$ lb., which can be measured with reasonable precision. A convenient factor for length would be about 40; a model 66 ft. long would therefore represent half a mile of full-scale equipment. By fixing closely spaced cylindrical beads to a fine wire, the length of the beads and their spacing being so chosen that the pantograph contact strip, accurately scaled, rides along the beads without introducing spurious vibrations, a construction is devised which has a mass equivalent to that of a large wire, associated with the elastic properties of a small wire. Because of elasticity requirements only two metals may be used for the wires, brass for the contact wire and tungsten for the catenaries. The contact wire is 0·0129 in. dia., the main catenary 0·0045 in. dia., and the auxiliary catenary 0·0032 in. dia. The beads are all made of brass; 0·0925 in. dia. and 0·072 in. long for the contact wire, 0·0738 in. dia. and 0·067 in. long for the main catenary, and 0·0463 in. dia. and 0·053 in. long for the auxiliary catenary. In all three wires, the spacing between the beads was set at $\frac{1}{32}$ in. so that, in the contact wire, the pantograph contact strip is always riding on three beads. The result is that the scaling factor for length becomes 32·5 and that for mass 1,220, both of which are sufficiently close to the desired values.

Although practical experiments have been in progress at Tolworth for only a few months it is apparent from the results so far achieved that the method of approach to the problem is the correct one, and it is to be hoped that the findings will soon be guiding the design of improved overhead equipment for all forms of electric traction.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Diesel Traction in Germany

October 7

SIR,—I was especially interested in the letters in your issues of September 9 and 23 as I have just returned from Germany. Mr. Bell could not have visited Germany lately or he would have been struck as I was, by the efficiency of the railways still very largely steam worked.

One often hears these days of extensive mileages worked by steam locomotives in Germany. This is borne out by the news published in your journal. In your September 16 issue, for instance, you recorded that during 1959 the high average mileage attained by coal-burning and oil-burning 4-6-2 steam locomotives of the German Federal Railway, rose to a peak of 28,700 km. (17,800 miles) by a coal-burning "01" class locomotive in the Kassel area, and that in the 1960 summer timetables the scheduled workings were up to a maximum of 936 km. (581 miles) a day.

If such high monthly mileages are obtainable by steam locomotives in Germany (over 15,000) one wonders what may be the advantages of the expensive diesel locomotives, especially in a coal-producing country. I know that a number of German steam engines are oil-burning ; but they are conversions from coal burning and could be converted back in any emergency.

Yours faithfully,

J. B. LATHAM

Channings, Kettlewell Hill,
Woking, Surrey

Pullman Services

October 8

SIR,—The new cars for the "Master Cutler" and other Eastern Region Pullman services are another example of British Railways' propensity for multiplying equipment designs for similar services.

The locomotive-hauled Pullman trains in the Eastern and North-Eastern Regions serve the same business clientele as the recently-introduced diesel Pullman trains in the London Midland and Western Regions, and run at about the same speeds and similar supplements are charged. The new cars, moreover, for the East Coast Pullman services were ordered from the same manufacturer, the Metropolitan-Cammell Carriage & Wagon Co. Ltd., as the London Midland and Western trains. Here was a compelling case for standardising designs.

Yet the new Eastern Region Pullman coaches differ from the earlier Midland and Western Region Pullmans in a multiplicity of details too small to be of any significance in route availability, but sufficient to have made a complete re-tooling and new sets of dies necessary at Metro-Cammell which would drive the delivery price up enormously. Thus the Eastern Region Pullman coaches are 1 ft. 7 in. shorter and 5 in. narrower than their Midland and Western counterparts, and their body profile is quite different.

Nor does the later Eastern Region design represent an improvement in appearance or passenger comfort. The Eastern Region windows are shorter, narrower and higher on the body sides than the Western and London Midland Pullman windows; this gives their passengers a much less good view. The coaches themselves have a heavy and clumsy appearance completely different from the sleek elegance of the Western and London Midland Pullmans.

Unlike the latter, the Eastern Region Pullman coaches are not air-conditioned, provide no luggage racks in their smaller vestibules, nor any adjustable reclining seats for first class passengers, who have to be content with the straight-back Edwardian movable armchairs. Yet with so many fewer amenities the new Eastern Region cars manage to provide 33 per cent fewer first class seats and to be 5 tons heavier than their London Midland and Western counterparts. Their only advantage over the latter is that they do provide first class passengers with a choice between compartment and saloon accommodation. But why such different standards of Pullman comfort from one Region to another ?

There is much more to be said for the Eastern Region policy of keeping to locomotive-hauled Pullman trains instead of multiple-unit sets. Unlike the expensive power plants of the Western and L.M. Region Pullmans, the standard diesel locomotives hauling East Coast Pullman trains can be kept busy during the night and at weekends, while travellers are likely to enjoy a smoother ride. If the "Trans-Europ Express" experiment of de-luxe multiple-unit trains was worth trying, it was also worth waiting for the results of the experiment before deciding the lines along which other Pullman services should be re-equipped. If the Pullman coaches running on East Coast services had become so ancient that their replacement could not be deferred even by two years, why not introduce the new Pullman multiple-unit trains in the Eastern and North-Eastern Regions in the first instance, and test the reaction of established Pullman customers to these new and different standards of accommodation ?

Yours faithfully,

F. E. LAMOND

13, Heath Street,
London, N.W.3

Riding Qualities of Passenger Vehicles

September 27

SIR,—As an engineer, not automotive or engaged on railway work, who rides in some of the stock referred to in your September 23 and preceding issues, I think that it is basically accepted that for good riding unsprung weight should be at a minimum; suspension geometry, shock absorbers, and dampers are incident to this.

It surprises me, therefore, that railway engineers who are showing in many directions that they are not necessarily tied to doing things because "Dad did it that way," have not exploited more thoroughly the frame-mounted motor unit with propeller shaft and bevel drive; a differential is really an unnecessary luxury on railway vehicles. It would bring about the necessary reduction of unsprung weight and relieve the motor of many of the road shocks and should consequently simplify bogie and motor design.

The success of the American P.C.C. type tramcar is undoubted, and indeed, the rolling stock for the new Toronto Subway, which I believe employs propeller shaft drive, was designed and built in the United Kingdom.

Why stop at that ? The employment of rubber-centered spring and plate stabilised wheels as on the P.C.C. car should also be considered. Anyone who has ridden in P.C.C. cars over very poor street tracks and road-side tracks up to speeds of over 60 m.p.h. cannot fail to be impressed.

Among the ticket-buying public considerable goodwill is being generated by improvements already evident as a result of British Railways' efforts to modernise a Victorian railway system. It is a shame that goodwill should be lost by rough riding in recently-built trains. Only a few of the travelling public know how to find the trailer cars, as do Mr. Douglas Gray and myself.

Yours faithfully,

E. J. DAWES, S.M.I.R.E.

10A, Highbury Crescent,
London, N.5

CONVERSION OF FORMER M.G.N. LINE INTO ROAD.—In furtherance of plans to use the former Midland & Great Northern Railway line for roads to provide a better route to the Norfolk coast and Broads from the Midlands, Norfolk County Council has decided to buy five stretches of line and to negotiate with the British Transport Commission for the acquisition of five others. In the case of the first five lengths the Minister of Transport has agreed to provide grants towards the cost of conversion.

THE SCRAP HEAP

Episcopal Engine Ride

The many distinguished people given the privilege of rides in locomotive cabs include very few bishops. After hoping for 50 years to ride on a footplate—of a steam engine, in his earlier days—the Bishop of Norwich, Dr. Launcelot Fleming, travelled recently by the Great Eastern Line of the Eastern Region, British Railways, from Norwich to Liverpool Street in the cab of a Brush Class "2" diesel-electric locomotive hauling the "Broadsman."

Not a Uniform Issue

Rhodesia Railways has a guard who would have had little competition from Joseph and his coat of many colours. Mr. D. R. Smith, now stationed at Livingstone, has something quite new in the way of jerseys. It was knitted by a friend. In the front in full colour, are red and green flags, lamp and whistle, while on the back is a Rhodesia Railways diesel-electric locomotive.—*From "Rhodesia Railways Magazine."*

Non-Scalpable Ticket

Railroad ticket scalping in the States has been such a source of loss in the past to the passenger revenues of the companies that most of them must be very jubilant over the announcement that a non-scalpable ticket has been invented. This is not the first time the claim has been made, but the device has the merit of being very simple. The device consists of a certificate printed on safety paper attached to each proper validated ticket. The safety paper has a distinct and peculiar unforgeable water mark, and can only be obtained from printers who are under bond to furnish it only to transportation or traffic undertakings. —*From "The Financial Times" of September* 27, 1900.

[To "scalp" an out-of-date ticket is to split it and affix the back of a cheaper ticket bearing a current date.—ED., *R.G.*]

Manx Scenes

In Douglas recently I remembered far-off summer days and childhood holidays. The fussy little green engines [of the Isle of Man Railway], with brass domes, copper-capped chimneys with brass numerals on their flanks, shining pipework, and old tea-pots filled with oil riding on their running plates would hold me spellbound. At this period the boat trains for each route left Douglas almost simultaneously; for nearly a quarter-of-a-mile the lines run side by side until the Port Erin line swings steeply away and upwards on its climb to Port Soderick. I would glower across at the smug occupants of the Peel and Ramsey boat train until, with a shrill whistle, the traditional exit would begin. Steam hissing from drain cocks, whistles shrieking, and chimneys blasting, each engine would surge forward; within yards the trains would be lurching side by side in clouds of soot and cinders. . . . A little way out from Douglas, on the Peel line, is the hamlet of Kirk Braddan, whose Sunday church services for holiday-makers draw big congregations. The railway provides a special train for matins.—*James Boyd in a B.B.C. broadcast.*

Flowers and Lobster Pots

Budleigh Salterton [on the Sidmouth Junction to Exmouth branch of the Southern Region, British Railways] gets a pat on the back from a woman passenger who congratulates the staff on their courtesy "and on the cleanliness and gaiety of the station (the result of flowers and lobster pots and a white-stained name)."—*From "British Railways Magazine."*

Weather-wise B.T.C. Ships

Three British Railways ships have earned an "Excellent Award" by the Air Ministry for the quality of their meteorological records; the vessels are on the list of voluntary observing ships. They are: *Byland Abbey* and *Kirkham Abbey*, which make full instrumental observations on the North Sea service from and to Hull; and *Duke of Argyle*, which makes observations of sea temperatures on the Heysham-Belfast run. The Marine Superintendent of the Air Ministry Meteorological Office states that the observations of all the British Transport Commission ships are of great value because of the variability and local character of weather around the home coasts, and that they do much to help the weather forecasts for shipping and coastal sea areas and the land forecasts for the general public.

Moonshine Line

One of the many ingenious proposals for the earlier Irish railways was that of Arthur Haire. In the early 1860's he planned a line along the foreshore from the then fashionable resort of Blackrock, near Dublin, to Dalkey. Between these points the tide recedes far at low water. Haire suggested building a railway on the firm, level foreshore, cutting across the inlets about 50 yd. from the mean tide level. The rails were to be bolted to heavy stone sleepers sunk in the sand to hard bearing and they were to be treated with tar and pitch to protect them from erosion by water. Two intermediate stations were to be formed by a stone built jetty turned at right angles to the line to form a platform. The train could only run when the tide was out but Haire suggested that when the sea was calm a "high-built" steam locomotive and coaches could make the trip when the tide was in. He considered that during the full moon such a water train journey would be an attraction to visitors. The scheme was not generally favoured, and was abandoned. That it was not impossible is shown by operation, many years later, of the electric railway from Brighton to Rottingdean; its cars ran, at high water, through seas rougher than are usually encountered in Dublin Bay—though there were frequent breakdowns of the electrical equipment.

Diesel Working of Electrified Line

For a period of about four months, electric train service between Shenfield and Chelmsford, Eastern Region, has been withdrawn and the suburban service is being worked with diesel and steam trains. The reasons for this are: (1) conversion from d.c. to a.c. of the electrified lines between Shenfield and Chelmsford, and (2) electrification between Chelmsford and Colchester to link up at the latter point with the lines to Clacton and Walton-on-the-Naze, already converted at 25kV. These works are part of the scheme for a.c. operation between Liverpool Street, Shenfield, Southend (*via* Wickford), Chelmsford, Colchester, Clacton and Walton.

Diesel multiple-unit train, one of the series replacing electric trains between Shenfield and Chelmsford during the change-over from d.c. to 50 cycles a.c.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

EAST AFRICA

Increased Railway Earnings

The railway revenue of East African Railways & Harbours for August was some £1,681,000, an increase of £9,000 compared with August of last year. The greater part of this increase was brought about by an increase in goods traffic receipts, which at £1,318,000 were £43,000 higher than the previous year. There were small increases of £600 in receipts from passenger and other coaching traffic and £1,200 from livestock servings. These were partly offset by lower earnings from hotel and catering, inland marine, road and miscellaneous services which were £36,000 down on 1959 figures.

The total earnings from railway and harbour services in August were approximately £2,127,000, against £2,051,000 in the same month last year.

Mnyusi-Ruvu Link

Earthworks and culverts on the link being built between Mnyusi, on the Tanga line, and Ruvu, on the Central line, are to be constructed by East African Enterprises Limited. Work recently was expected to begin almost immediately, starting at the southern end about 2½ miles west of Ruvu, ending about 10½ miles to the north, and take about five months to complete.The whole link will cost some £2 million.

SOUTH AFRICA

Record Railway Earnings

The £200,000,000-revenue mark was passed for the first time by the South African Railways during the 1959-1960 financial year. This represents the revenue earned by all services, Railways, Harbours, Airways and Road Transport. The figures are preliminary totals. The approximate revenue was £200,692,961 compared with £187,149,934 during the preceding financial year.

Training Administrative Officers

The first of a series of courses for administrative officers of the South African Railways and associated services was inaugurated recently at the Esselen Park Railway Training College. The students attending the courses, which are specially designed to train railway officers of the future, were selected by means of tests conducted by the National Institute for Personnel Research of the Council for Scientific & Industrial Research. The first course was attended by 28 officers from various departments.

INDIA

Standardisation in Railway Buildings

Standardisation of doors and windows in railway buildings has been urged as an economy measure by the Minister of Railways, Mr. Jagjivan Ram. Doors, windows, jambs, and frames, he suggested should be produced at one or two centres on each of the eight railways, using timber from old coaches, and scrap metal.

Container Service for Parcels

The Central Railway has introduced a container service for parcels weighing more than 2 lb. which otherwise tend to be damaged in transit when loaded with larger packages. The service operates from Bombay Wadi Bandar to Bhusaval, to stations on the Bhusaval-Nagpur line, to Itarsi, to stations on the Itarsi-Allahabad line, to Khandwa, and to stations on the metre-gauge line *via* Khandwa. The containers are sealed with lead. Apart from reducing the risk of pilfering, the new service has reduced time and effort in handling, notably at stations where train guards are changed.

QUEENSLAND

Increase in Fares and Rates

Increases in fares and freight charges have been announced by the Queensland Government Railways. This decision has resulted from a series of inquiries into railway finances following an operating loss of over £6,000,000 in the last three years. The increases, which became effective on October 1, are intended to raise railway revenue by £2,000,000 a year. First class country fares have been increased by 10 per cent and second class by 25 per cent. Certain freight charges have been increased by 10 to 20 per cent.

CANADA

Trans-continental Trains

The Canadian Pacific Railway has announced details of changes in rolling stock on its trans-continental trains "The Canadian" and "The Dominion." The scenic dome streamliner "The Canadian" continues to offer all classes of accommodation and dining facilities in daily trans-continental service. "The Canadian" carries three scenic-dome coaches under the new arrangement, one of them a lounge observation sleeping coach; the other two dome coffee shop coaches.

The stainless-steel stock of "The Canadian" is augmented by the addition of a through sleeping coach between Toronto and Regina. This car continues to provide convenient overnight service between Winnipeg and Regina. An additional sleeping coach also operates on "The Canadian" between Regina and Vancouver. "The Dominion" carries only coach, express, and mail traffic in through trans-continental service. Local sleeping car accommodation however is provided between Montreal and Sudbury and Toronto and Sudbury with through sleeping car service from Toronto to Sault Ste. Marie. Sleeping car accommodation is also available between Fort William and Winnipeg.

IRELAND

Stations Closed on Bray Line

Coras Iompair Eireann has closed four intermediate stations on the Dublin Westland Row to Dun Laoghaire and Bray line. The evening train service between Dublin, Brayand Greystones has been curtailed. Where rail services are withdrawn, C.I.E. will continue to operate a system of through rates to and from places formerly served by rail and road

Diesel Traction in Burma

Three-car diesel train set, built by Waggonfabrik Talbot, operating on the Rangoon suburban line. Rangoon Station is in the background

beyond railheads, based on existing station-to-station rates, for merchandise and for livestock from fairs.

FRANCE

Lines Breached by Floods

Services on several lines were interrupted by the recent floods caused by heavy rain. The sections affected included the main line of the South Western Region of the S.N.C.F. from Paris to Toulouse and lines in the Clermont-Ferrand area.

SWITZERLAND

Diesel Locomotives

The first of 10 additional "BM 6/6" class 1,700-h.p. C-C diesel-electric locomotives has been delivered to the Federal Railways. Four of this class were supplied in 1954-55 by the Swiss Locomotive & Machine Works (mechanical portion), Sulzer (engines and ancillary equipment), Sécheron (main and auxiliary generals, electro-pneumatic starting contactors, and Simplex voltage regulator for the auxiliary generator), and Brown Boveri (traction motors, control gear, and other electrical apparatus). The five now in service are used for shunting heavy rakes in marshalling yards near Basle, Chiasso, and Geneva, and in the Rhine port installation at Brisfelden.

Re-signalling at Lausanne

Lausanne passenger station and approach lines are to be re-signalled, with control from one central box. Train-describers are to be installed to indicate trains running eastwards into Lausanne from Renens, where lines from Geneva and from Vallorbe and Neuchâtel converge.

WESTERN GERMANY

More Visitors from Britain

The number of visitors from Britain during the first seven months of 1960 rose by 31 per cent compared with last year, and add appreciably to Federal Railway passenger traffic. Many British motorists are reported to have accompanied their cars on the car/sleeper services between major centres.

Re-building of Stations

Three hundred of the 450 stations and adjoining buildings of the Federal Railway have been rebuilt since 1945 at a cost of some £37·5 million.

SYRIA

Reconstruction of Hedjaz Railway

The Executive Committee in Damascus of delegates of the Governments of Jordan, Saudi Arabia, and the United Arab Republic (Syria), which has been studying reconstruction of the derelict lines of the Hedjaz Railway, has completed plans in accordance with an agreement between the three Governments. The committee now seeks the services of consulting engineers. After repairs to a war-damaged section, this and other lengths are to be unified under one management. The mileage of the Hedjaz Railway at present open to traffic is about 350.

Publications Received

Signalling for Railway Modernisation: Part 2.—An illustrated booklet obtainable from the Westinghouse Brake & Signal Co. Ltd., of 82, York Way, London, N.1, gives brief particulars of work completed, in progress, or planned by the firm on signal and marshalling yard installations as part of British Railways' modernisation plan. One of the principal series of works mentioned is that between Crewe and Manchester, London Midland Region, in connection with a.c. electrification; the brief description is accompanied by a folding plate showing track and signalling layouts in three areas concerned. The re-signalling of the London suburban area of the Great Eastern Line of the Eastern Region between Bethnal Green and Enfield Town, Chingford, Hertford East, and Bishop's Stortford, also associated with electrification, is illustrated with a route-map. The work at Glasgow Central, Scottish Region, involving reduction in the number of tracks on the Clyde bridge, is shown in another folding plate. Other re-signalling works noted are those on the East Coast main line of the North Eastern Region between Newcastle-on-Tyne (Heaton) and Burnmouth; at Newton, a multiple junction south of Glasgow on the Scottish Region main line to Carlisle; at Pelaw, near Newcastle-on-Tyne, N.E. Region; on the London Tilbury & Southend Line, Eastern Region; and on the (Glasgow) Cathcart Circle line of the Scottish Region, associated with a.c. electrification. Reference also is made to equipment supplied for Millerhill Marshalling Yard, Scottish Region; to signalling and equipment for Carlisle Marshalling Yard, London Midland Region; to re-signalling between Crewe and Edge Hill (Liverpool) and between Crewe and Stafford, L.M. Region, in connection with a.c. electrification; to re-signalling at Gateshead, N.E. Region; to re-signalling of the Southern Region lines from Hither Green to Tonbridge and from Hither Green to Sidcup, from Sevenoaks to Otford, and from Tonbridge to Grove Junction (Tunbridge Wells) in connection with Phase 2 of third-rail electrification from London to the Kent Coast *via* Tonbridge and Ashford; and to mechanisation and power signalling of the new marshalling yard being built at Newport, N.E. Region.

The Pyrene Range of Processes for Aluminium. This pamphlet, published by The Pyrene Co. Ltd., Great West Road, Brentford, Middlesex, gives details of Bonderite 710, 701, 740 and 170 processes for paint bonding and the Pylumin process for bonding and corrosion resistance.

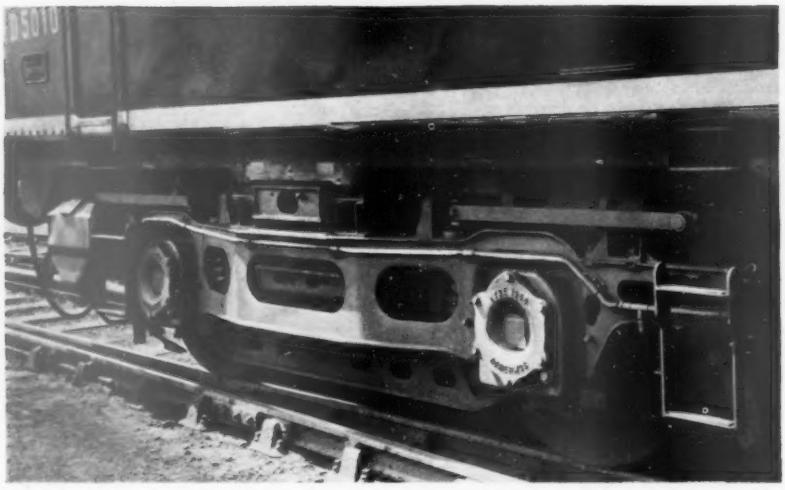
Impalco Aluminium.—A 69-page catalogue of technical data for Impalco aluminium, heat-treatable and non-heat-treatable alloys, and other aluminium alloys produced by the Imperial Aluminium Co. Ltd. Additional tables show weights of plate, sheet, and strip material and of bar and tube, in most standard sizes, also composition limits are stated and mechanical and physical properties are compared with those of other metals. Copies may be obtained from the Imperial Aluminium Co. Ltd., P.O. Box 216, Witton, Birmingham, 6, or any branch of Imperial Chemical Industries Limited.

Strength Properties of Timber.—The resistance of timber to applied or external forces involves several specific mechanical properties, which largely determine the suitability of a species for a particular purpose. Basic knowledge of the strength properties of a species of timber is acquired chiefly from laboratory tests, carried out in controlled conditions on small specimens of timber of regular grain and free from defects. Forest Products Research Bulletin No. 45 "The Strength Properties of Timber" describes the procedure and methods of tests on 2 in. and 2 cm. specimens, the internationally accepted standards. These were formerly published in Bulletins 28 and 34, respectively, which are now superseded. More extensive routine testing by the latter standard has provided additional data for a number of species, and the present bulletin gives up-to-date information on the physical and mechanical properties of 172 home-grown and imported hardwoods and softwoods. The bulletin is published for the Department of Scientific & Industrial Research, by H.M. Stationery Office, whence it is obtainable, price 3s. 6d. (3s. 10d. by post).

Electrification News: Closing the Gap.—Passengers by the London to Colchester, Clacton, Walton, Ipswich, and Norwich services on the Great Eastern Line of British Railways, Eastern Region, recently were handed news-sheets entitled *Electrification News* describing electrification progress and problems in the London area and in Essex. The principal subject is "closing the gap," that is, conversion at 50 cycles a.c. between Chelmsford, and Colchester, so as to link up with the Colchester–Clacton–Walton lines, also the conversion from 1,500V d.c. to a.c. of the lines from Liverpool Street to Shenfield, Southend and Chelmsford. There are two editions of *Electrification News*, identical except for messages from different Traffic Managers. In one edition Mr. H. W. Few, Traffic Manager, Liverpool Street, discusses matters from the point of view of the London area; in the other his counterpart at Norwich, Mr. G. G. Goodings, considers the problem as it affects services to and from East Anglia.

Pressure-Lubricated Axleboxes

Special plain-bearing design with history of over 30 years applied in modern forms in Great Britain, Europe and overseas



Bogie of British Railways Derby-built 1,160-b.h.p. diesel locomotive fitted with Athermos boxes ; wheel load 9·5 tons

IT is now well over a quarter-of-a-century since the first Isothermos axlebox was introduced into railway service and in the ensuing period many thousands have been fitted to all types of locomotives and rolling stock, including the French National Railways' two record-breaking electric locomotives which attained 205 m.p.h. in 1955. However, within this period the design has not remained static ; even the name has been changed, the modern box generally being known as the Athermos —" indifferent to heat," it might be said—as distinct from the " equal heat " of the original.

More than 20 years ago the Isothermos Company concentrated on the application of hydrodynamic lubrication to rolling-stock bearings, following the principles defined by Osborne Reynolds in 1886 relating to the formation of an overall film of oil between two related surfaces in motion. In practice, a convenient gap is left between the boring of a solid bearing and the axle on which it is fitted.

Resisting Layer of Oil

By supplying the gap with lubricating oil and rotating the axle, a continuous resisting layer of oil is built up between the bearing and the axle, thus balancing the load imposed on the bearing. Provided certain conditions of viscosity are respected, and if the dimensions of the bearing and journal are judiciously determined, enough feeding oil is all that is necessary to prevent any contact between the axle and bearing whatever the loads and speeds.

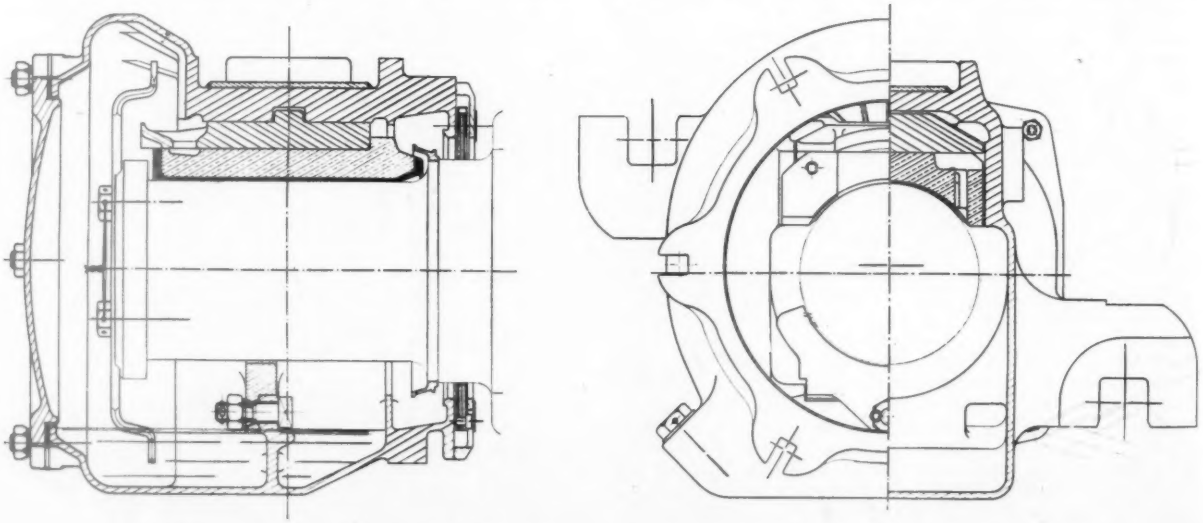
A great attraction of the box to railway engineers has always been the retention of the plain type of bearing ; yet it would scarcely be true to say that the Athermos box is simply another type of plain bearing, for its principal feature of forced or positive hydrodynamic lubrication at all speeds, and its oil-tight and dust-tight construction, bring it into line with roller-bearing boxes as far as these aspects are concerned. Yet it retains the constructional advantages claimed for the plain-bearing box over ball-and-roller types.

Hydrodynamic Lubrication

Hydrodynamic lubrication applied to axleboxes requires a suitable additional boring of the axlebox bearing, and an adequate supply of oil between the bearing and the journal, with means suitable for distribution and able to circulate oil at the rate of 10 to 15 gal. an hour at a track speed of 40 m.p.h.

In turn, these requirements necessitate a box which is absolutely oil tight, water tight, and dust tight. When all these conditions are met, low temperature and almost constant-temperature operation is assured, even when, as in the record-breaking S.N.C.F. electric locomotives, a combination of 18,000 to 21,000 lb. load and a rubbing speed of 37 to 41 ft. per sec. is found. This is achieved today with an oil consumption that is negligible.

To ensure continuous hydrodynamic lubrication a forged steel flinger arm is bolted to the end of the journal,



Sections through Athermos axlebox of French single-phase 50-cycle C-C electric locomotive

and when rotating this lifts up the oil contained in the bottom part of the cast-steel body of the axlebox and pours it on to the top of the bearing. The oil then flows down through channels in the bearing and is evenly distributed all along the journal length. A continuous layer of oil, or oil film, is thus built up between journal and bearing, balancing the load borne by the bearing. Loss of oil through the journal length. the axlebox is prevented by an oil-deflector ring which returns the surplus oil back to the sump. A dust shield is also fitted to prevent the entry of dust or water.

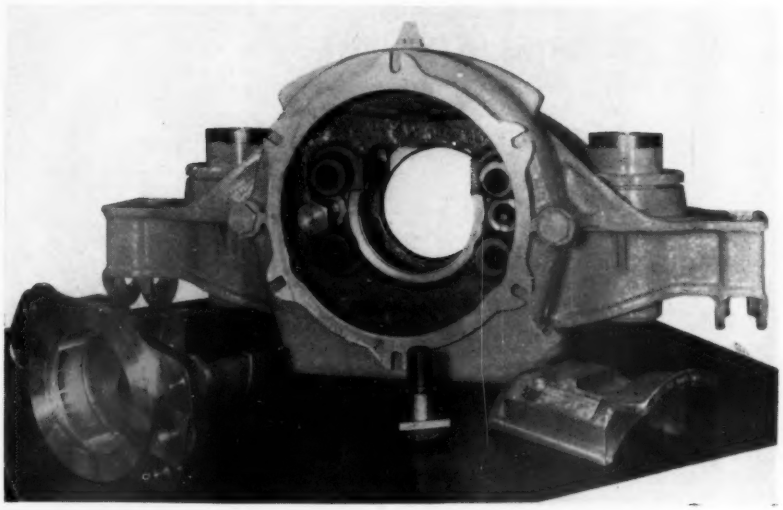
Adjustable Bottom Bearings

An adjustable substantial bottom bearing or keep prevents, or at least restricts to a minimum, movement of the axle inside the box. By increasing the contact surface between the journal flange and the bearings, the specific pressure is reduced, as is the possibility of end wear on the bearings.

As the bottom bearing receives an additional supply of oil from special grooves cast inside the axlebox casing, and also from the top bearing, the bottom half of the journal is kept in a permanent oil bath, thus improving the initial provision of hydrodynamic lubrication under starting conditions.

For reasons which are well known, the normal plain-bearing axlebox, whatever its type of lubrication, does not stand up well to heavy or repeated lateral thrusts. Nor is it free from considerable relative movement between journal and bearing. The resulting impact forces, acting axially and at right angles to the centre line of the axle, lead to general poor operation and need for more or less frequent re-metalling.

On the other hand the Athermos box incorporates a channelled bearing which provides adequate oil over the lateral-thrust surfaces; and the bottom bearing, providing a considerable increase in the end-thrust surface, limits and controls these impact stresses. Moreover, as suitable devices are incorporated in the axlebox casing and the top bearing to provide additional oil feed, that is, an oil bath, for the bottom half surface of the journal, the flow of lubricant is accelerated, and the operational temperature is reduced.



Athermos axlebox casting and bearing constituents as used in the record-breaking 205-*m.p.h. S.N.C.F. electric locomotive of Series* 9001

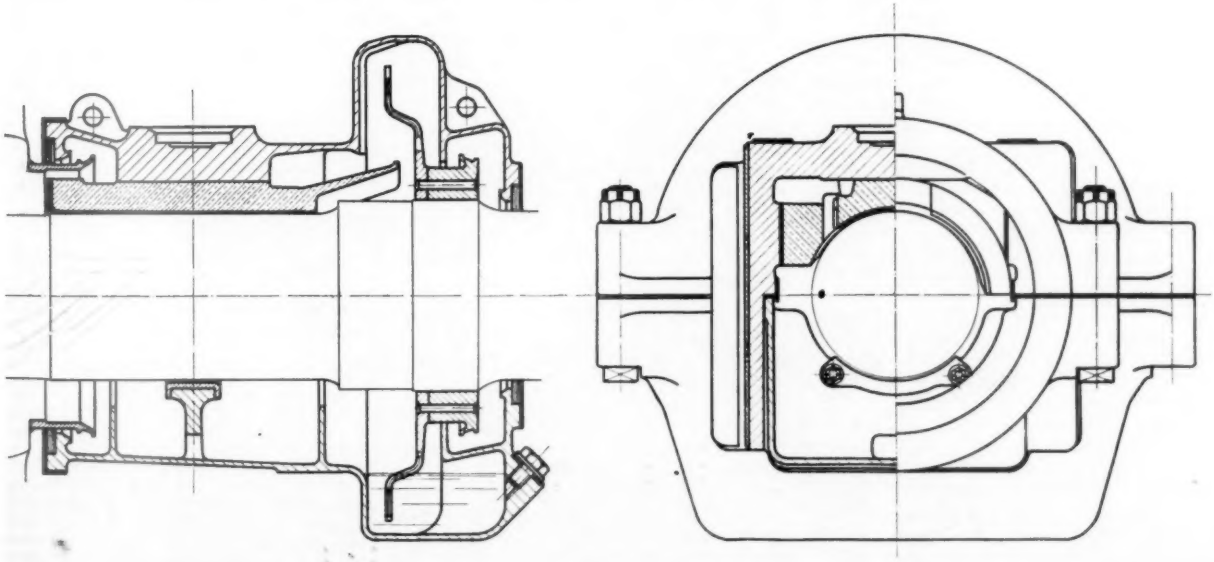
Bottom Bearing Portion

Distribution of the load over a greater area, combined with the existence of a considerable layer of oil between the opposing surfaces, makes unnecessary the lining of the bearing ends with whitemetal, and improves the performance and life. The bottom bearing also restricts to a minimum the movement of the axlebox in relation to the journal, which is completely enveloped over the lower half of its circumference and is guided over its whole length.

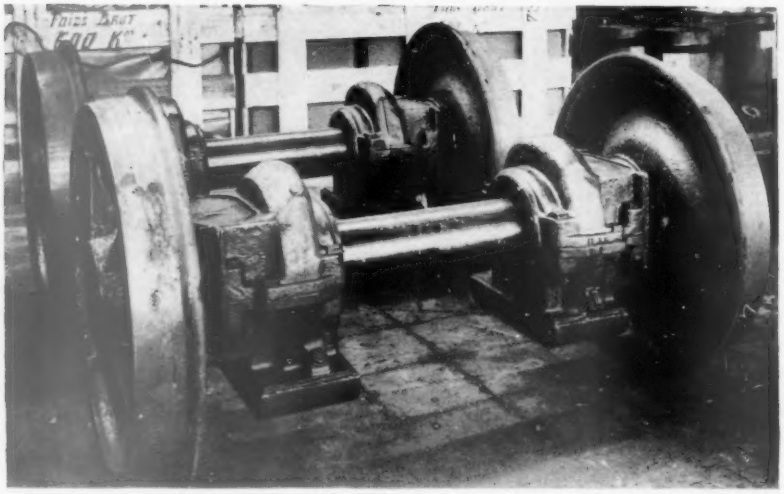
Increased Steadiness

Increased steadiness of the axlebox is obtained by this construction, owing to the limited movement of the axle; yet the axle retains all the well-known relative flexibility of axles with solid bearings. Also a reliable oil-tight sealing device can be incorporated for tipping wagons. Maintenance and replacement charges are decreased due to the longer life of the bearings; re-linings and re-adjustments to length are less frequent: and in certain cases a service life of six times that of corresponding standard bearings has been achieved.

Oil-tightness of normal plain-bearing axleboxes is a problem which becomes progressively more difficult as the speed



Inside Athermos axlebox of express d.c. electric locomotive of 20 *tons axle-load and* 1,000 *h.p. per axle*



Inside Athermos bearings, with heat insulation included, for steelworks wagons

of trains increases. Speed accentuates the air pressure and consequently the dust in the air, and also causes greater agitation to the lubricating oil. The problem of proofing the box applies, firstly, to its outer end, where the oil flung on to the sides of the box must not cause seepage or leakage between the front cover and the box itself. Yet more difficult still are the proofs at the inner end of the box, where with high speeds circulation of the oil has to be abundant.

Many pad or packing oil-lubricated boxes fail in the proofing of the outer cover. In the U.S.A., front axlebox covers are kept in position by springs; but these ultimately give way due to wear from vibration or impacts suffered by the vehicle. The current Athermos axlebox incorporates a cast or forged steel front cover held in position by an embedding groove, tightened by bolts against this groove in which a flat synthetic rubber joint is fitted. The rubber joint must have a " Shore " hardness falling within well-defined limits. It must be sufficiently flexible to fit over any slight irregularities in the machining, sufficiently hard to keep its shape when the bolts are tightened, and impervious to oil effects.

Centrifugal Oil Sealing

The sealing device for the inner face of the box is designed on the principle of a deflector ring, known as a centrifugal sealing device. Oil leakage is then prevented by a combination of this deflector sealing ring, shrunk hot on the shoulder of the axle, and a recuperation chamber forming part of the body of the box itself.

At low speeds the oil accumulates in a recessed portion of the ring and drips on to the lower section. At high speeds the oil is flung on to the surface of the recuperation chamber, and due to the sloped profile of the chamber drips towards the inside of the casing. At very high speeds the oil is flung on to the surface of the chamber, which throws it back inside the box at an angle approximately equal to that of impact. The shape and dimensions of the recuperation chamber and of the sealing ring are interdependent. They must combine in such a way that oil which would normally tend to leak out is caught by the ring and projected back into the lubricating circuit.

Dust Shields

After proofing the box against oil leakage, it is also necessary to prevent any infiltration of dust or water. This can be assured by a dust shield properly designed and fitted. The dust shields usually fitted to pad or packing lubricated axleboxes are imperfect sealing devices. The seat of the dust shield is generally a rough-cast part of the axlebox casing, which means that some tolerance in manufacture is necessary; furthermore, to facilitate the fitting into its seat, the dust shield is normally notably thinner than the seat. Such dust shields may have a play of $\frac{1}{8}$ in. to $\frac{3}{16}$ in. inside their seats. When adding to the above the space through which dust may enter, because of wear against the rotating journal, it is clear that such a design cannot provide a reliable degree of tightness.

Various materials and designs have been tried both in the Isothermos laboratory of Paris and under running conditions, including the use of laminated pressed wood impregnated with a proper grade of synthetic resin or synthetic rubber compounds, providing the friction-resisting qualities necessary.

Sealing Gasket

A self-centring sealing gasket made of synthetic rubber compound has been designed for tipping and other wagons. This device ensures satisfactory operation provided it is fitted to an axlebox with bottom bearing, so that the relative play between the axle and the axlebox casing is kept to a minimum. The rubber compound must meet exacting requirements, such as convenient flexibility, satisfactory coefficient of friction, and resistance to the action of lubricating oil at temperatures up to 300° F.

The annular shaped gasket, incorporating a bellows, and designed to absorb the play, is fitted to a polished extension of the oil-deflecting ring which is shrunk on to the shoulder of the axle. A circular split-spring of suitable tension ensures oil tightness around the journal, and at the inner edge of the axlebox casing a bolted plate forms a counter-joint.

A special, proofed oil-retaining design of axlebox casing has been developed to meet the particular requirements of the box when tilted, whatever the type of tippler, and this has successfully been tried out in Britain and in Austria. Shunting tests at speeds up to 18 m.p.h. have also been carried out to prove the robustness of the box in collisions and derailments.

S.N.C.F. Electric Locomotives Fitted

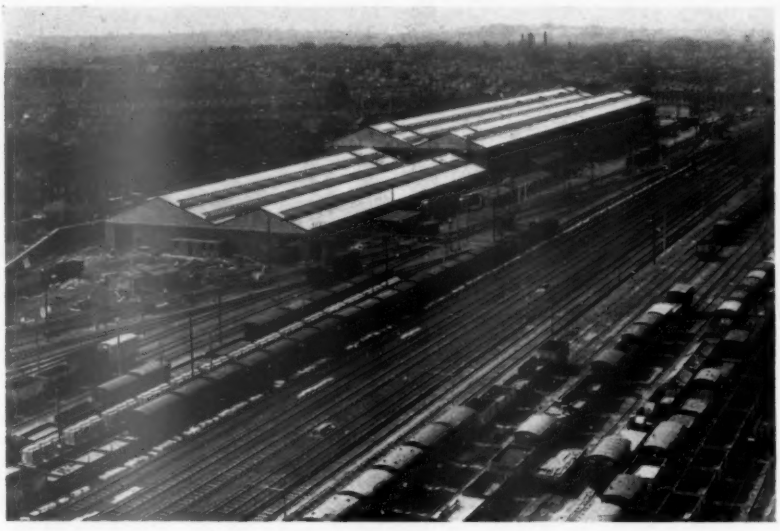
In France recently all new electric locomotives have been fitted with Athermos boxes, and some pre-war locomotives have been rebuilt with them, to a total at the beginning of 1960 of 813 d.c. and a.c. locomotives up to 5,000 h.p. Moreover, the fast Bo-Bo locomotives supplied for the Paris-Lille a.c. electrification also have this type of box. All these boxes have an electric shunt device inside, to prevent any pitting of bearings or journals. The large diesel locomotives of the S.N.C.F. also have the Athermos form of axlebox.

Among thousands of wagons fitted in several European and African countries, 100 flat wagons of the S.N.C.F. have been subjected to continuous observation since entering service in 1953 so as to gain an exact idea of any wear. After 125,000 miles in 30 months for each wagon, at commercial speeds up to 65 m.p.h., the average total wear at the bearing end of the journal flange was 0·03 in.; the bearing end wear on the inner journal shoulder was 0·02 in.; and the wear on the bottom bearing no more than 0.015in. in the middle and 0.06 in. on the thrust sides of the end. Axleboxes of this type designed for U.I.C. (International Union of Railways) two-axle wagons are being equipped in increasing numbers; and hundreds of mineral wagons for British Railways have been so fitted.

HEATERS FOR L.T.E. DOUBLE-DECK GREEN LINE BUSES.—Twenty-eight London Transport " RT " double-deck buses in regular use as duplicate vehicles on Green Line services have been fitted with heaters on both decks, so as to bring their standard of comfort up to that of regular single-deck Green Line coaches. The heating installation consists of a small radiator and electric circulating fan housed in a special compartment under the front near-side seat in the upper, and a similar unit under the front off-side seat of the lower, saloon. Hot water from the engine cooling system is pumped to the upper saloon heating unit and then passes to the lower unit, completing the circuit by returning to the engine cooling system. The circulating fans are individually controlled by the conductor from switches on the rear platform. Indicator lamps show when fans are operating. The units under the seats were supplied by the Key-Leather Co. Ltd.

Hither Green Continental Perishable Traffic Depot

Newly-constructed depot in the Southern Region for traffic imported from the Continent and conveyed under bond to the London area



Aerial view of depot looking north-west

PREVIOUS to the construction of the Continental perishable traffic depot at Hither Green, British Railways, Southern Region, Continental fruit, vegetables and other perishable traffic imported from the Continent and conveyed under bond to the London area was normally dealt with at Southwark, but in the absence of warehouse accommodation, consignments which could not be accepted concurrently by consignees had to be carted to Blackfriars or Nine Elms Goods Depots to await acceptance by traders.

Absence of siding facilities at Southwark for stabling or sorting wagons also created operating difficulties, and additional train mileage, because of necessity of working all empty wagons to Bricklayers Arms for sorting, and at peak periods of traffic full wagons had to be stabled at various stations on the route from Dover to await acceptance at Southwark. In addition, heavy track occupation in the London Bridge area prevented traffic movements to and from the depot during business hours.

Furthermore, Continental perishable traffic being seasonal in character, often rendered it necessary to divert some of the traffic to Battersea Wharf for unloading, which proved difficult to arrange at short notice, necessitating as it did the transfer of supervisory and checking staff, recruitment of casual labour, and special arrangements with the Customs authorities.

After consideration of the various factors involved, a site for a new traffic depot was selected on the up-side of the London-Dover main line between Hither Green and Grove Park Stations, this site being adjacent to one of the marshalling yards in the London area of the Eastern section, Southern Region, at which interchange of traffic is made with other Regions. It also has the advantage that besides being alongside the London to Dover main line, it avoids the many serious operating problems associated with terminals sited nearer London. Delivery to merchants by road from the depot is considerably assisted by its close proximity to the South Circular Road.

In general terms, the scheme comprises a goods shed some 1,003 ft. long and 157 ft. wide incorporating on the north east side a siding and unloading dock 50 ft. wide and 5,500 sq. yd. in area, with a covered roadway 70 ft. wide immediately adjoining the south west edge of the dock. Between this roadway and the shed wall is a second siding for the unloading of consignments, direct from rail wagon to lorries where these consist of whole wagon loads for one consignee, or which do not require sorting. Each of the sidings can accommodate 25 to 30 Continental type wagons.

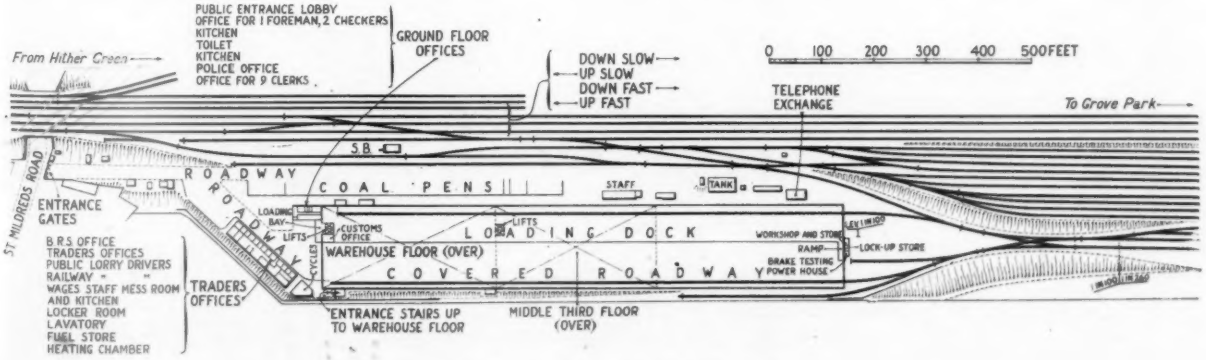
First Floor Layout

An additional storey, with lifts between the floors, has been built over two-thirds of the shed at the London end. Half of this will be used as a warehouse space, including a portion partitioned off for use as a Customs bond, and will also accommodate necessary railway and Customs offices. The remaining half has been constructed concurrently to allow for future development. At the London end of the shed a separate block provides messing and lavatory facilities for staff, 12 lock-up offices for traders, a boiler room, and two rooms for the use of railway and public lorry drivers respectively.

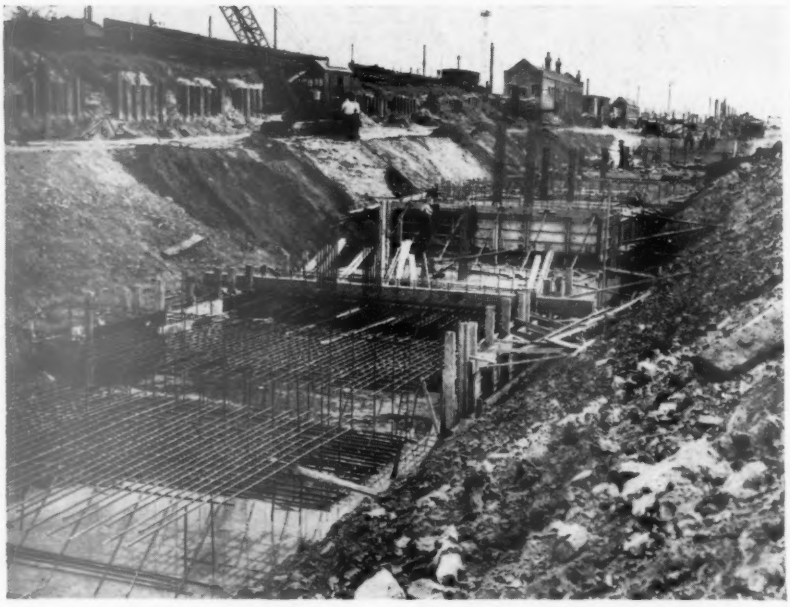
A small external loading bay at the London end of the shed is constructed for loading up goods brought down from the warehouse floor by lift, and immediately adjoining is a small office block containing offices for clerks, police and checkers.

Brake testing equipment and battery chargers for the electrically-driven fork-lift trucks are also installed at the country end of the shed. The shed is connected to St. Mildreds Road by an existing roadway to the coal yard 25 ft. in width, which widens out near the shed to give adequate parking and turning facilities.

In all, about 150 railway staff and 10 customs staff will be employed at this



Layout of depot, showing rail connections



Strip reinforced concrete footings for central line of columns

depot, which it is anticipated will deal with some 200,000 tons of fruit, vegetables and other perishable import traffic a year, with every likelihood of expansion in the future.

Direct connections from the main and local lines at the Grove Park end of the site lead to arrival and departure lines, each with 380 ft. clear standing room, which in turn are connected through a scissors crossover to any one of six holding sidings, from which wagons can be propelled forward into either of the shed roads.

The holding sidings, together with an engine release road, are equipped with overhead conductors for the use of electric locomotives, fitted with both collector shoes and pantograph. A short siding for brake vans, a holding siding for 10 wagons outside the shed, and a short shunting engine spur are also provided.

Site Conditions

The site of the shed and sidings was formerly allotment gardens, but because of the undulating state of the site and the difference in level between the main road entrance at St. Mildreds road, and the rail connections to the main railway line at the Grove Park end, considerable earthworks were required. As the excavated material, mainly clay, was unsuitable for filling, the latter was imported and in the main consisted of brick, rubble, sand, and chalk. To contain this filling, a reinforced concrete gravity wall was erected adjoining Further Green Road at the London end of the depot. This wall is on an average 11 ft. in height above the adjoining footpath. The total height of the wall above foundations is 22 ft. and the construction length 551 ft. 6 in.

Where limited space and the presence of residential property rendered it necessary, the slope was cut back and supported by Larson steel sheet piling over a length of 434 ft. Pile lengths varied from 45 ft. to 17 ft. and the maximum penetration was 27 ft. In all, 121,200 cu. yd. of material was excavated and removed from the site and some 98,000 cu. yd. of filling imported from elsewhere. In addition, some 22,200 cu. yd. of ashes were brought in for ballasting under sidings and permanent way connections.

Shed Construction

The shed, 1,002 ft. 9½ in. long by 157 ft. 2 in. wide overall, is divided into two unequal bays, with minimum clear distances between supporting columns of 64 ft. 7 in. and 85 ft., respectively. The bay nearest the main line contains a siding with unloading dock 50 ft. wide. The surface of the dock is 3 ft. 6 in. above rail level, and has a clear head room of 14 ft. 5 in. The 85-ft. bay with a minimum clearance of 16 ft. contains a concrete roadway 70 ft. wide, with a rail track adjacent to the south west wall. The roadway is wide enough to allow the simultaneous end-loading or unloading of lorries from the dock edge and wagons standing on the siding. Dock floor level is 4 ft. 3 in. above road level and the roadway has a fall towards the loading dock of 1 in 68 to allow for washing down, a suitable concrete channel with a continuous cast-iron grating is installed at the foot of the loading dock wall for that purpose.

The loading dock floor and roadway are designed for a loading of 2 cwt. per sq. ft. plus additional point loads which may be imposed by the Coventry Climax Universal fork-lift trucks. This loading has also been used in designing the warehouse floor above.

Along each track are installed at 44 ft. 6 in. centres testing points for vacuum brakes, the electrically driven vacuum pump being housed in a small building at the country end of the shed. Access from the roadway to loading dock is by an inclined ramp at the country end; steps are installed at the London end of the shed. Battery chargers are also installed at the country end for servicing the fork lift trucks, and a steel framed structure built out from the loading dock on to the roadway facilitates inspection and maintenance of these trucks from below. A small overhead steel gantry with block and tackle is also incorporated with the structure.

The design of foundations was based on the safe bearing pressures of the undisturbed virgin soil which varied from 0·48 tons per sq. ft. at 5 ft. below the original surface to 1·75 tons per sq. ft. at a depth of 10 ft. The outer concrete columns of the double storey portion of the shed had reinforced

Concrete floorbeams and columns for double-storey portion of shed

concrete bases varying between 14 ft. x 9 ft. and 16 ft. x 15 ft. by 3 ft. deep, resting on the virgin soil from which piers either 3 ft. 6 in. or 4 ft. sq. were carried up to ground floor level. Centre columns with their heavier loading were carried in the same way, except that the reinforced concrete bases 22 ft. x 10 ft. in area, were themselves carried on a continuous R.C. strip footing 22 ft. wide by 3 ft. 6 in. deep.

The need to support the heavy warehouse floor with a single line of columns placed along the south west edge of the loading dock has necessitated the provision of heavy two-span continuous reinforced concrete beams, which, with their column supports are spaced throughout at 22 ft. 3 in. centres. These beams each 2 ft. 9 in. wide have an overall depth including floor thickness of 5 ft. 1 in. and 7 ft. in the shorter and longer spans respectively. Top and bottom reinforcement consists of 1½ in. dia. high-tensile-steel bars with a minimum yield point of 60,000 lb. per sq. in.

Expansion Joints

At every seventh or eighth bay expansion joints are formed by the provision of two concrete frames side by side. These are 2 ft. 1½ in. wide in place of the normal width of 2 ft. 9 in. On the outer face, the spaces are filled with Flexcell and covered with copper strips. The floor joints are similarly filled with Flexcell and sealed with Pliastic compound. The upper floor over the beams is of Cawood-Wharton construction, consisting of precast concrete beams and filler blocks which have an overall depth of 12 to 13½ in. exclusive of 1½ in. of granolithic surfacing.

Walls throughout are of 11 in. cavity brickwork, the outer skin which overlaps the concrete columns having a gap of 5 in. at every other column on the centre line, to allow for any movement between the columns and the brickwork. Above the brick walls on both floors continuous glazing in metal frames has been fixed, most of which is capable of being opened outwards.

General view of upper warehouse floor, showing customs office on left and goods agent's offices in centre

On the upper floor the outer concrete columns of reduced section carry reinforced concrete eaves beams on which are supported single-span ridge type roof trusses of conventional design. These are spaced at 14 ft. 10 in. centres and allow a minimum head room of 13 ft. 3 in. under the tie-rods. A steel valley beam 16 in. x 17 in. carries the trusses on the centre line of the concrete columns.

Roof Covering

The roof covering is of double asbestos cement sheeting, with an intervening layer of 1 in. insulating material, and natural lighting is provided by six rows of continuous patent glazing, with an external footwalk to permit easy cleaning. The upper floor covers two thirds of the building, the middle third being constructed for future use, and the third at the London end as a warehouse and customs bond.

The customs bond, formed of circular steel columns between which are fixed steel-wire mesh on angle framing, takes up an area of 1,925 sq. yd. of the floor area, and while rigidly bolted in position, can be moved, if required, to a new position without structural alterations. Access between the upper floor and the loading dock for merchandise is by four electric hydraulic lifts each 11 ft. 3 in. x 8 ft. 5 in. and designed to carry a load of four tons. Two of these are sited at the London end of the shed and give access to the loading dock and also to a small loading bay outside the shed. Warehoused goods can therefore be discharged to traders without entering the shed. The other two will serve both the customs bond and the future area, having doors opening on to both areas; these connect to the loading dock below.

The single-storey portion at the country end of the shed is similar in layout to that already described. Column dimensions and foundations are, however, smaller, and carry steel trusses of similar design and spacing to those erected over the upper floor. Walls and side glazing are also similar, but adjusted to suit the smaller columns.

Fruit being unloaded from Continental goods wagon on to pallets

Beams Cast In Situ

The first floor reinforced concrete beams were cast *in situ* and to facilitate speedy progress, four gantries, each made up of Bailey bridging and military trestling mounted on narrow-gauge tracks, were used to support the shuttering and reinforcement, being jacked up as necessary to obtain the correct level before pouring the concrete. These gantries, after setting of the concrete, were jacked down and the gantries progressively moved forward.

Thirty-four beams were cast in this manner over a period of five months. The actual placing of the concrete for one beam, amounting to 90 cu. yd. was done in the short space of time amounting to seven hr. per beam.

For the movement of goods from floor to floor, four goods lifts were installed by Aldous & Campbell Limited. The lift cars are 11 ft. x 8 ft. x 8 ft. 9 in. high, which enables two fork-lift trucks to enter and off load their pallets at one time.

(*Continued on page* 454)

Electric Traction Research Laboratory

Study of the mechanical characteristics of overhead systems supplying power for electric traction

General view of laboratory at Tolworth

THE British Insulated Callender's Cables Group has set up a laboratory at Tolworth for the study of the mechanical characteristics of overhead systems supplying power for electric traction. The object is to obtain fundamental data on which improved designs can be based. The laboratory houses a scale model which faithfully reproduces all the dynamic mechanical characteristics of the full-scale equipment, at simulated speeds up to at least 100 m.p.h.

The laboratory measures about 200 ft. by 20 ft. To enable the models to be accessible to instruments and to facilitate handling, they are mounted on a steel-angle structure, 4 ft. high. This supports the track, which is of standard model railway $\frac{5}{8}$-in. aluminium-flanged rail and which is in the form of a closed loop.

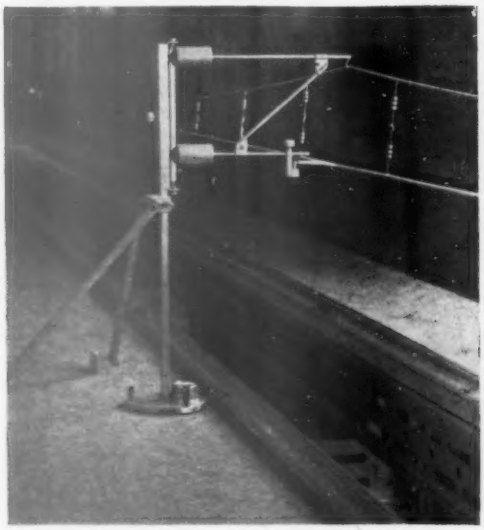
An actual train speed of 100 m.p.h. is represented by a model running speed of nearly 18 m.p.h. To attain this speed in the straight test sections, provision has been made for suitable deceleration and acceleration at the curves, and necessitated the provision of check rails and banking. The middle parts of the straight sides, the test sections 80 ft. long, are enclosed and temperature controlled.

The first form of support being studied is the hinged cantilever, consisting of a diagonal strut tube supported from porcelain insulators by a stranded tie-wire and hinged at the vertical mast. The upper end of the strut tube holds the main catenary. The auxiliary catenary and contact wire are attached to hinged registration and steady arms. The latter, which can move independently of all other hinged members, are arranged to be always in tension and are reversed at alternate supports to give the necessary stagger of the contact wire.

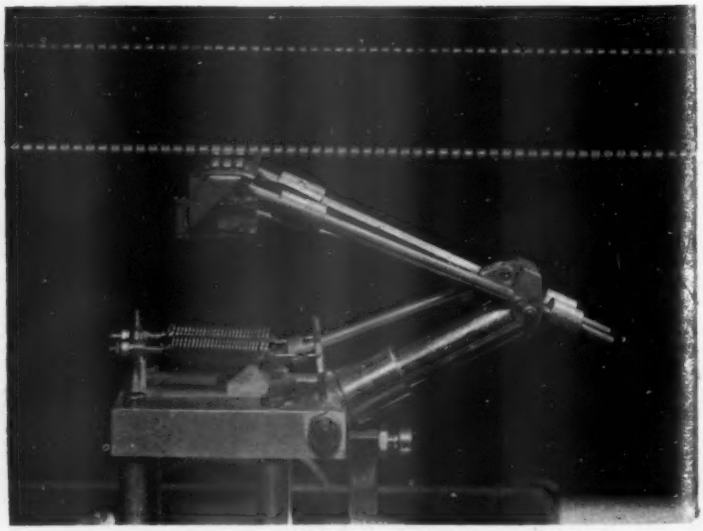
In the model, the inertial mass and distribution of mass are scaled, using pre-determined scaling factors. All pivots on the model are made as free as possible, because frictional effects cannot be scaled, and only those hinges are included which affect the movement of the system as a whole during operation.

Measuring Devices

Position, velocity and acceleration of the trolley are determined from devices which feed 15 kc/s. signals to a receiver from a transmitter carried under the trolley. A beam of light is focused on to a photo-electric cell through a number of holes equally spaced around the periphery of an extra wheel on the trolley. As the wheel rotates the beam is interrupted and pulses proportional to the trolley velocity are fed from the photo-electric cell to the receiver. There they trigger a multi-vibration producing pulses of constant length, the mean level of which is read on a meter calibrated in ft. per sec. Acceleration is measured by taking the output through a differentiating circuit to another meter. On the other side of the trolley, a beam of light is directed downwards and its reflection from small movable polished aluminium blocks on the structure is collected by a photo-electric cell to provide pulses indicating the position of the trolley.



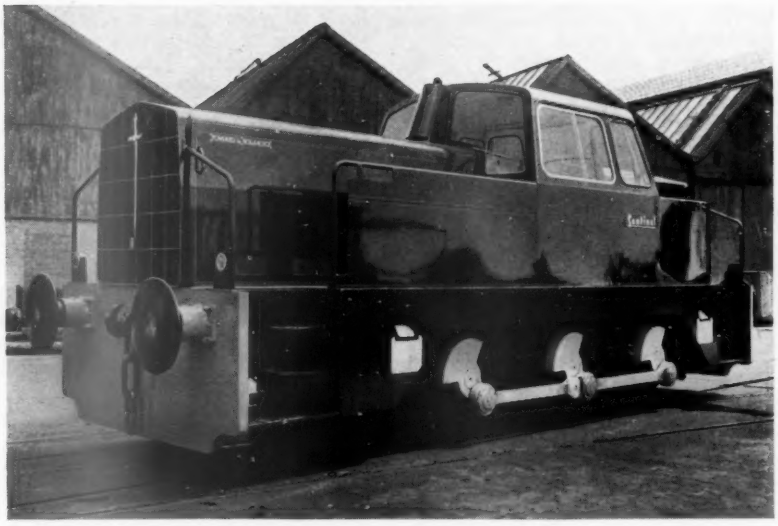
Model support structure



Model pantograph head, showing contact with beads

Diesel-Hydraulic Industrial Shunters

Sentinel range of 0-4-0 *and* 0-6-0 34-48 *ton locomotives with torque converter transmission*



Six-wheel shunter, showing good lines provided by design of sloping cab sides and side aprons

THE first of a batch of 0-6-0 diesel-hydraulic shunters now building at Sentinel (Shrewsbury) Limited works has been delivered to Dorman Long (Steel) Limited, Middlesbrough. Powered by the Rolls-Royce supercharged eight cylinder diesel with a net rating of 283 b.h.p., the 0-6-0 is a natural development of the 0-4-0 introduced several months ago.

A Rolls-Royce torque converter, manufactured under licence from the Twin Disc Clutch Company, U.S.A., is fitted. The standard model has a maximum tractive effort of 29,300 lb., and a maximum continuous speed of 18 m.p.h., and can operate continuously at full load at all speeds from 0·9 m.p.h. upwards. Alternative maximum ratings can be provided to suit customer requirements.

Features of the design are the central cab giving good visibility over the front and rear buffers, low load gauge height, and simple controls.

Leading particulars are as follow:—

	0–6–0	0–4–0
Type		
Weight	48 tons	34 tons
Maximum tractive effort ...	29,300 lb.	22,600 lb.
Maximum continuous speed	18 m.p.h.	16.6 m.p.h.
Converter stall torque ratio	5·2: 1	5·2: 1
Engine h.p. (net)	283 at 1,800 r.p.m.	207 at 1,800 r.p.m.
	ft. in.	ft. in.
Gauge	4 8½	4 8½
Overall length	26 10½	24 0
Overall width	8 6	8 0
Overall height	10 6	10 4
Wheelbase	9 8	6 6
Wheel dia.	3 6	3 2
Minimum rail clearance ...	8	8
Minimum curve	1½ chains rad.	1 chain
Fuel capacity	227 gal.	215 gal.

Cab and Superstructure

The superstructure is arranged with a bonneted enclosure at each end of the cab and deep side plates extending up to the cab window height. At each corner of the locomotive is a shunter's riding platform with steps up to running plate level. This provides a safe platform within the width of the locomotive and convenient access to the doors which are at the rear of the cab. A wide shunter's walkway is provided across the locomotive behind the rear bonnet.

The cab is fully glazed and the sloping sides allow the driver to lean through the side windows from his seat. The driving seats are at both sides of the control consol. Controls are fully duplicated, with all directional controls arranged in line of travel and non-directional controls at right-angles, towards the driver. This bi-directional control layout gives a natural control movement for travel in either direction.

Cab Equipment

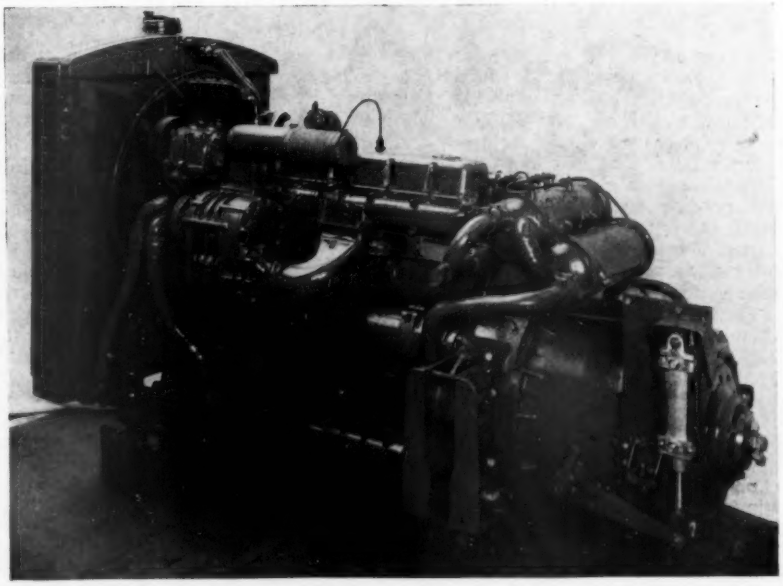
Driving instruments and fault warning lights are mounted on a sloping panel on the control desk. Electrically operated screen wipers are fitted. Cab heating is by a radiator/fan unit taking heat from the engine coolant circuit. Head and tail lights are fitted at each end of the superstructure and these are automatically switched by the reversing lever to give the correct indication for either direction of travel. A neat fairing between the bonnet top and cab roof level is used to conceal the engine exhaust pipe.

The whole of the superstructure has been made robust, to withstand shocks in shunting. To facilitate handling of the heavy side covers used on the bonnet, the covers slide on ball-bearing rollers and the hinged top section is counter-balanced.

Mechanically-Driven Supercharger

The power unit is the eight-cylinder Rolls-Royce diesel type C8.SFL with a bore of 5⅛ in. and a stroke of 6 in. Fitted with a mechanically driven Rootes type supercharger, the engine has a locomotive rating of 283 b.h.p. at 1,800 r.p.m. and a torque rating of 920 lb.-ft. at 1,300 r.p.m.

Hardened wet liners are fitted in the cast-iron monobloc and the cylinder heads are cast in groups of four. Engine



Power pack, showing mechanically-driven Rootes blower and power actuation of over-centre clutch combined with torque converter

auxiliaries are driven from the timing gear which is at the free end. The lubrication system, incorporating heat exchanger cooling and full-flow filters, operates with a semi-dry sump. The oil-bath type air cleaners are fitted with centrifuge pre-cleaners. Mechanical linkage from the cab is used for control of the all-speed governor. Engine starting is by a 24-V. electric starter motor. The engine cooling system is pressurised and thermostatically controlled. Safety equipment is fitted which provides automatic shut-down in the event of excessive coolant or converter fluid temperature, or low lub-oil pressure. Fuel is carried in a 227 gal. capacity tank housed in the bonnet behind the cab.

For locomotive applications the Rolls-Royce engines are considerably de-rated below the equivalent automotive rating, to permit the maximum period between major overhauls.

On shunting duties major overhaul is recommended after 9,000 hr. of running, as shown on the engine service counter. On single shift working this represents about seven years' service. Between overhauls, decarbonising is recommended at 3,000 hr. and injector changing at 1,200 hr.

Torque Converter Transmission

The Rolls-Royce three-stage torque converter type C.F. 11,500 Ms.300, has a stall-torque ratio of 5·2: 1 and provides a continuously variable transmission to suit the load throughout the operating range. Engine fuel oil is used as the working fluid and this is circulated through the system by an engine driven pump.

Cooling is by means of a heat exchanger connected in the engine coolant circuit and the converter can be operated at full load between 0·9 m.p.h. and 18 m.p.h. Continuous operation below 0·9 m.p.h. is possible, but the power used must be reduced slightly.

A power-operated twin plate over-centre clutch is used to disconnect the torque converter from the engine when starting up and for prolonged periods of idling. Operation is automatic upon change of direction. The toggle action withdrawal gear holds the clutch in the fully engaged or release positions.

The Self-Changing Gears Limited final drive forward/reverse unit has a reduction ratio of 11·64: 1. Movement of the dog clutch to change direction of travel is effected by a compressed-air cylinder operated from the control desk. An interlock prevents a change being made until the locomotive is stationary and the power control is at zero. "Gear-home" indicators are fitted on the control desk.

Frame and Running Gear

The main frame members, 23 in. deep and 2 in. thick, are reinforced by additional longitudinal members and side skirts to provide a general distribution o the buffing loads. The complete structure is designed to confine damage to repairable local sections and to minimise distortion of the main members. The buffer beams are carried to within a short distance of the rails. Cast-iron frame-bracing cross-members act as ballast units for adhesive weight.

The forged-steel axles are located in the frame by cast-steel horn check brackets dowelled and rivetted to the frame side members. Roller-bearing axle boxes and laminated bearing springs are used, the axleboxes and horn guides being fitted with manganese steel liners.

The final drive forward/reverse box is directly mounted on the centre axle and the drive is transmitted to the leading and trailing axles by side rods. The side rod bearings, incorporating self-contained oil reservoirs, are housed in spherical seatings to relieve twisting forces caused by uneven tracks.

The wheel rim profile of the leading and trailing axles is B.S. contour A, and for the centre drive axle B.S. contour G, this combination providing good track holding and assisting in the negotiation of sharp curves. All wheels are in solid rolled steel and the 5¾ in. wide tyres have a sufficiently deep section to allow up to 4¼ in. wear on the diameter before re-tyring is required. Sanding gear, air operated, is fitted at the leading wheels in each direction. Control of the compressed air brakes is by Laycock-Knorr-Bremse equipment.

Chain Drive on Two-Axle Type

The 0-4-0 locomotive, weighing 34 tons, has a tractive effort of 22,600 lb. and is powered by the Rolls-Royce six-cylinder supercharged diesel engine type C6.SFL. This is rated at 207 b.h.p. at 1,800 r.p.m. The drive to the wheels is by Renolds duplex roller chains from a centrally positioned reverse/reduction box. The chain drive has a reduction ratio of 1·237: 1. Radius arms permit vertical wheel movement without variation of the chain centres. The cab and superstructure of the 0-4-0 is generally similar to the 0-6-0 model as described above.

The principal sub-contractors are as follow:—

Power equipment and torque converter	Rolls-Royce Limited
Transmission-final drive	Self-Changing Gears Limited
Wheels and axles ...	John Baker & Bessemer Limited
Brake pneumatic equipment	Laycock Engineering Limited
Control equipment components	Lang Pneumatic Limited
Electrical equipment and fuel pumps	C.A.V. Limited
Batteries	D.P. Battery Co. Ltd.

Hither Green Continental Perishable Traffic Depot

(*Concluded from page* 451)

To meet the heavy condition of static loading this imposes on the lift, electric-hydraulic drive has been used. These lifts have a static capacity of 10 tons with a carrying capacity of four tons, and operate at a speed of 75 ft. per min. The lift cars and enclosure are fitted with power-operated Pele type gates. The installation required the sinking in each case of a borehole 22 ft. deep and 2 ft. 6 in. internal diameter which was carried out with a rotary drill.

For the mechanical conveyance of merchandise palletisation is used. The 2,000 pallets are 48 in. x 40 in. in area. These are handled by 18 Coventry Climax battery operated fork-lift trucks of 18,000 lb. capacity at 24 in. load centres, fitted with side shift attachment. They have a speed of 5 m.p.h. laden, or 5½ m.p.h. unladen and can lift at 30 ft. per min. The batteries supplied by Oldhams Limited are of 420-Ah. capacity with a 5-hr. discharge rate. In addition, 10 Slingsby hand-operated pallet trucks with a capacity of 30 cwt. have been provided. For the easy movement of merchandise from point to point, 35 sets of gravity roller conveyors, each 8 ft. in length, have been installed.

At the London end of the main shed, electrically operated leaf-type doors have been fitted. The doorways at the country end, which are smaller, are fitted with ordinary electrically - operated roller shutters.

Ancillary Buildings

The main administrative offices of approximately 3,500 sq. ft. are sited on the floor of the warehouse, where offices for the agent and sub-agent with their clerks and the usual staff amenities are provided, against the London end of the shed. On the south west side offices occupying approximately 1,550 sq. ft. have been constructed for the use of the Customs personnel. All are constructed of light timber partitioning and/or breeze blocks.

Additional office accommodation of approximately 1,500 sq. ft. has been constructed at the north corner adjacent to the external loading dock, to accommodate a public enquiry office, police office, and an additional clerical office.

A large single-storey building 148 ft. 6¾ in. x 32 ft. has also been provided on the right of the roadway approach to the shed containing 12 separate lock-up offices for letting to traders. The heating chamber providing hot water and radiator heating to all offices and mess rooms is also incorporated in the building.

The general scheme and design of the civil engineering and building work were formulated under the direction of Mr. A. H. Cantrell, Chief Civil Engineer, Southern Region, British Railways, to the requirements of the Shipping & Continental Manager. Mr. W. J. A. Sykes, Chief Mechanical & Electrical Engineer, was responsible for the supply and installation of mechanical equipment.

Taylor Woodrow Construction Limited were engaged as design contractors for the detailed design and execution of the works.

The principal sub-contractors were as follow:

Structural steelwork ...	Redpath Brown Limited
Electric light and services	Rashleigh Phipps & Co. Ltd.
Heating installation ...	Comyn Ching & Co. Ltd.
Hollow block flooring ...	Cawood Wharton Limited
Electro-hydraulic lifts ...	Aldous & Campbell Limited

RAILWAY NEWS SECTION

PERSONAL

Sir Ralf Emerson has been appointed a Director of the Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Mr. W. H. Jenkins, Chief Traffic Manager, New South Wales Government Railways, who, as recorded in our September 2 issue, has recently retired, joined the New South Wales Railways in 1912, and later served with the Australian Imperial Forces in Egypt, France and Belgium in the 1914-18 war. He has had extensive experience of railway clerical, operating and administrative duties. He was attached to the personal staff of the Northern Area Commissioner from 1925 to 1932, and subsequently occupied the positions of Train Controller, Special Officer, and Outdoor Traffic Superintendent before appointment as Traffic Works Superintendent in 1948. He became Passenger Trains Superintendent in 1951 and Transportation Manager in 1952. He acted as Chief Traffic Manager for the greater part of 1955, and was appointed to that position in March, 1958. He was awarded the O.B.E. in the 1958 New Year Honours List.

Mr. W. H. Jenkins
Chief Traffic Manager, New South Wales Government Railways, 1958-60

Mr. J. L. Russell
Appointed Chief Traffic Manager, New South Wales Government Railways

Mr. H. A. Greeniaus, Assistant Vice-President of the Canadian Pacific Railway has retired. Mr. A. L. McGregor has been appointed Assistant Vice-President of Canadian Pacific Railway Department of Personnel, Montreal. Mr. J. V. Forrest, Assistant to the Vice-President, has assumed Mr. Greeniaus' senior administrative duties, and Mr. J. C. Ames, who has been engaged in special duties, will return to his former position of Assistant to the Vice-President.

Mr. S. G. Jones, Legal Adviser to the London Transport Executive, has been appointed Secretary to the Executive.

Mr. J. B. Mitchell, Managing Director, Scottish Central Carting Co. Ltd., Leith, Edinburgh, has been elected National Chairman of the Road Haulage Association Limited. Mr. G. K. Newman, Chief Executive Officer of the Association, has been re-designated Secretary General. and Mr. Eric W. Russell has been appointed Deputy Secretary General.

Sir Owain Jenkins has been elected a Director of the Singapore Traction Company.

We regret to record the death of Mr. E. Casey, formerly General Manager of the New Zealand Government Railways.

Mr. K. K. Mukherjee, Divisional Superintendent, Northern Railway of India, has been appointed Chief Operating Superintendent of the Western Railway.

Mr. R. Shervington, Assistant District Traffic Superintendent, London (Western), Woking, British Railways, Southern Region, has been appointed Traffic Superintendent, Line Traffic Manager's Office, South Eastern Division, Southern Region. The appointment will become effective on October 19.

Mr. R. W. MacDonald, Assistant Director-General of Finance, National Coal Board (Great Britain), has been appointed Chief Accountant, East African Railways & Harbours, in succession to Mr. T. H. Baldwin.

Mr. J. L. Russell, Assistant Chief Traffic Manager, who, as recorded in our September 2 issue, has been appointed Chief Traffic Manager, New South Wales Government Railways, Australia, began his railway career in the Traffic Branch in November, 1922, and since then has had wide experience in the various parts of the State. In recent years he has been appointed successively Freight Superintendent, Commercial Manager, Transportation Manager, and Assistant Chief Traffic Manager. He was appointed to this last position in 1957. Mr. Russell has recently returned from a three-months overseas tour studying trends in traffic operations.

Mr. T. C. West, Estate Agent & Rating Surveyor, London Transport Executive, has retired, and Mr. J. I. McGillivray Principal Executive Assistant, Estate & Rating Department, has been appointed to fill the vacant position.

Mr. E. H. Kinselle, Deputy Head of the Freight Development Section, Traffic Headquarters, York, North Eastern Region, who, as recorded in our September 16 issue, has been appointed Head of the Freight Development Section, Traffic Headquarters, York.

Mr. E. H. Kinselle

Appointed Head, Freight Development Section, Traffic Headquarters, York, N.E. Region

Mr. F. L. Jagger

Appointed Assistant Regional Establishment & Staff Officer, E. Region, Liverpool Street

Mr. D. H. Millership

Appointed Assistant (Salaried Staff), Regional Establishment & Staff Office, L.M. Region

joined the London & North Western Railway Company at Watford as a Probationer in 1917, and was trained in the goods, traffic and coaching departments in London, North Wales, and the North of England. Later he held positions in the Chief Goods Manager's Office at Euston, Aldersgate Street in the City of London, and the District Commercial Manager's Office, Derby. During the 1939-45 war he served at various Command Headquarters in the United Kingdom, overseas with the 8th Army in Italy, and later in the Middle East, with the rank of Lt. Colonel As an A.E.R. Officer, Mr. Kinselle holds a War Office appointment as Quartering Commandant in Scottish Command. From 1947 to 1952 he held appointments at Derby, Nottingham, Bradford, Glasgow, and Dundee, and in 1952 he was appointed to the District Commercial Manager's Office, Dundee, as Head of the Canvassing & Development Section. In 1956 he became Chief Commercial Representative at Leeds. Two years later he was appointed Deputy Head of the Freight Development Section, Traffic Headquarters, York.

Mr. J. W. Denford, Principal Accounts Assistant, London Transport Executive, has been appointed Accounts Officer.

Coras Iompair Eireann Appointments

The following have been appointed Area Managers of Coras Iompair Eireann (Irish Transport Company): Mr. C. F. Clune to be Area Manager, Dublin; Mr. L. Dunne to be Area Manager, Cork; Mr. I. F. Higgins to be Area Manager, Limerick; Mr. P. Murphy to be Area Manager, Galway; Mr. W. A. O'Neill to be Area Manager, Waterford. Mr. K. G. Brady is to be Deputy Area Manager, Dublin.

Mr. H. W. Mills, Assistant General Manager & Traffic Manager of Wilts & Dorset Motor Services Limited, has been appointed Director & General Manager of the Southern Vectis Omnibus Co. Ltd., Newport, Isle of Wight.

Mr. F. L. Jagger, Assistant (Salaried Staff) to the Regional Establishment and Staff Officer, London Midland Region, Euston, who, as recorded in our September 16 issue, has been appointed Assistant Regional Establishment & Staff Officer, Eastern Region, Liverpool Street, began his railway career on the former L.N.E.R. in the District Superintendent's Office, Leeds Central, in 1924. He worked in various branches of the Operating and Commercial Departments in Yorkshire until the 1939-45 war, during which he served in the Royal Engineers (Movement Control), with the position of A.Q.M.G.(M), Rail & Road, Central Mediterranean Force Headquarters and was awarded the O.B.E. In 1946, Mr. Jagger was appointed to the Staff Section of the Chief General Manager's Office, L.N.E.R. and subsequently served in the Regional Staff Office, Eastern Region and in the Staff & Establishment Department, Railway Executive Headquarters. In 1950 he was appointed Assistant (Salaried Staff) to the Regional Establishment and Staff Officer, Southern Region, Waterloo. In 1955, he became Assistant (Salaried Staff) to the Regional Establishment & Staff Officer, London Midland Region.

Mr. Leonard Hodges has retired from the board of the Sheepbridge Engineering Co. Ltd.

Mr. W. G. Hall, Traffic Manager of Eastern Counties Omnibus Co. Ltd., has been appointed Assistant General Manager of that company with effect from September 1. His new appointment is additional to his position of Traffic Manager.

Scottish Transport Council Appointments

The following have been appointed Members of the Scottish Transport Council until September 21, 1963:—

Chairman

The Hon. Lord Kilbrandon.

Members

Colonel D. H. Cameron of Lochiel, representing the British Transport Commission; Mr. Robert McKean, representing the British European Airways Corporation; Mr. I. P. R. Napier, representing David MacBrayne Limited; Mr. Robert Taylor, representing the Scottish Advisory Council for Civil Aviation; Sir John Banks, representing the Transport Users' Consultative Committee for Scotland; Mr. W. Hughes, and Mr. T. G. Robinson, Independent Members.

The Secretary is Mr. M. M. Stuart.

Mr. D. H. Millership, Head of Section (Salaried Staff), British Railways, London Midland Region, who, as recorded in our October 7 issue, has been appointed Assistant (Salaried Staff), Regional Establishment & Staff Office, L.M. Region, was educated at the Orme Boys' School, Newcastle-under-Lyme, and began his railway career with the former London Midland & Scottish Railway as a junior clerk in the District Goods Manager's Office, Stoke, in 1927. In 1932, he was transferred to the Operating Department and, after experience at various stations in North Staffordshire and North Wales, joined the Department of the Superintendent of Organisation & Staff at Derby. In 1945, on the decentralisation of the staff organisation at Derby, Mr. Millership was transferred to the Watford Headquarters of the Chief Operating Manager and, in 1948, he was transferred to the Regional Establishment & Staff Office. In 1956 he was appointed Head of Section (Salaried Staff).

Mr. J. R. M. Whitehorn has been appointed Deputy Overseas Director of the Federation of British Industries. He will take charge of all the F.B.I. Geographical groups.

Mr. P. Blandford has been appointed Manager, Technical Sales, at Ferodo Limited.

Mr. P. J. Daglish has been appointed Special Executive responsible to the Managing Director of D. Napier & Son Ltd.

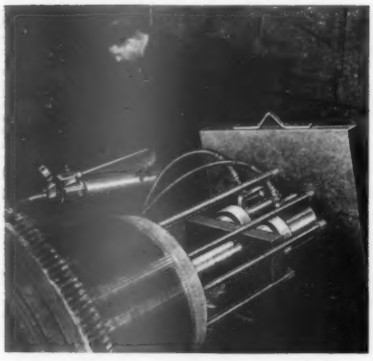
Messrs. Merz & McLellan have announced that they have taken Mr. T. W. Wilcox into partnership, with effect from October 1.

Mr. L. Harper, has been appointed Vice-Chairman of the board of the Dowty Group Limited, and Mr. E. S. Gibbons has been appointed to the board of Coventry Precision Limited.

Sir Richard Snedden has been elected to the board of The Superheater Co. Ltd. Mr. Harold Melhuish has retired from the board.

Mr. S. Jessop is relinquishing his appointment as Sales Manager of Fredk. Town & Sons, Ltd., and Woodhouse & Mitchell, Limited, subsidiaries of Thos. W. Ward Limited, and rejoining the parent company.

NEW EQUIPMENT AND PROCESSES



Hydraulic Rams and Pumps

LOADSTAR portable hydraulic plant-maintenance equipment has been extended in range to include rams and pumps of 3—100 tons capacity.

In the typical application illustrated, two 50-ton hydraulic rams are being used to remove the commutator from a large d.c. generator armature of the railway-traction (diesel-electric) type, during major repairs. Pulleys and gears can be drawn in a similar way, using remote-control hand pumps. There are attachments for most industrial maintenance operations including pulling, pushing, lifting, pressing, and bending. Single-unit rams and attachments of 3—20 tons capacity can be supplied in kit form.

Further details may be obtained from J. W. Pickavant and Co. Ltd., Apkoway Works, Bow Street, Birmingham, 1.

Self-Loading Tractor-Scraper

HANCOCK 10E2 elevating scrapers, of 10 cu. yd. capacity, are built essentially for jobs where self-loading is mandatory.

It is claimed that they will load quickly under moderately difficult conditions because of the exclusive chopping action of the slat-type elevator. This is driven by LeTourneau-Westinghouse motors to chop and pulverise the material and carry it rapidly off the scraper blade high into the bowl. The soil-pulverising action should also make spreading easy and uniform so that it eliminates the need for a separate finishing tool.

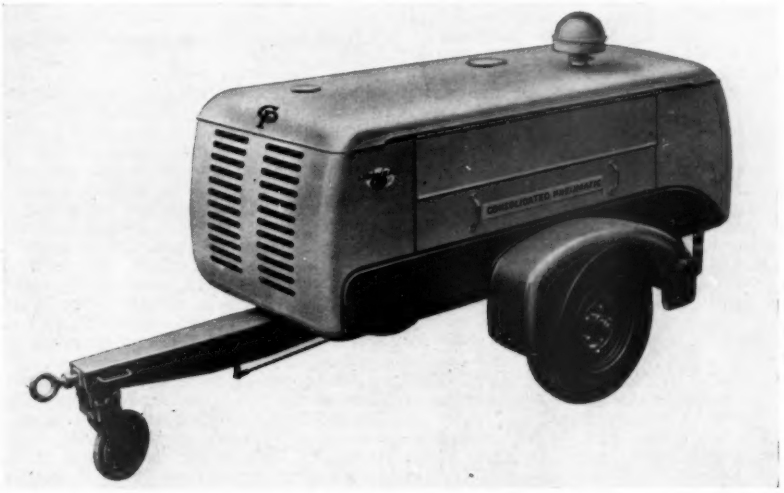
The Model D LeTourneau-Westinghouse Tournapull, with General Motors 4–71 143-b.h.p. diesel engine, is well matched to the requirements of the 10E2 scraper which was built specially as a part of this combination. It is capable of speeds up to 30 m.p.h.

Further details may be obtained from the LeTourneau-Westinghouse Company, Peoria, Illinois, or the Hancock Manufacturing Company, Lubbock, Texas, U.S.A.

Mobile Diesel Compressor

A REVISED version of the C.P. 125 Power Vane compressor of 125 cu. ft. per min. capacity has a new streamlined canopy and towbar support. The canopy is designed to allow easy access to the compressor unit.

The basic compressor design is unaltered; it consists of two eccentric vane-type compression stages mounted in line with the engine, with provision for positive alignment of the set by means of tandem pieces bolted between the engine and first-stage compression casing, and between the two compression casings. This arrangement also facilitates dismantling of either stage for inspection purposes and allows replacement of a damaged casing without the need for replacing both casings. The rotors of the two stages are connected by dog-type coupling.



The compressor is driven by a four-stroke, four-cylinder Ford 592E water-cooled diesel engine, developing 47-b.h.p. at 1,800 r.p.m. on a continuous 12-hr. rating. The engine has a cylinder bore of 3·937 in., a stroke of 4·526 in., and the compression ratio is 16: 1. A Simms SPE-A multi-cylinder fuel pump is used; injection nozzles are of the four-hole type. The pistons are of die-cast aluminium alloy, tin-plated, with combustion chambers in the heads. Engine starting is by 12-V. electric system.

Normally the set is mounted on a two-wheel chassis as illustrated with a retractable towbar-support wheel. Parking and over-run brakes are installed; road speeds of up to 20 m.p.h. are allowed. A four-wheel mounting is also available. A hinged rear cover allows access to two ¾ in. take-off cocks and the fuel and compressor oil fillers; lockable hinged side shutters are secured by short sliding arms. The tool-box is beneath the canopy. The overall length, including towbar, is 12 ft. 5 in., the width 5 ft. 1 in., and the height 5 ft. 7½ in. The dry weight is 3,192 lb.

Further details may be obtained from the Consolidated Pneumatic Tool Co. Ltd., 232, Dawes Road, London, S.W.6.

Protection of Aluminium

CROMCOTE is a process developed for the protection of aluminium and aluminium alloys against corrosion and should be of particular value because of the increasing use of these materials in railway vehicle construction.

The coatings produced by the chromate solution have the additional property of low electrical resistance. They can vary in appearance from almost colourless to deep bronze, the corrosion-resistance varying with the depth of colour. Excellent paint-bonding properties are claimed.

The Cromcote solution is prepared by adding 1½ oz. of Cromcote salts and 18 mls. of nitric acid (s.g. 1·42) to each gal. of water. After the mixture is stirred and allowed to stand for a few minutes, it is ready for use. It should be contained in a tank of stainless steel or other acid-resisting material. An insoluble residue remaining plays an essential part in the formation of the coating.

The parts to be treated, which should be free of grease, are immersed in the solution at room temperature. The depth of colour required depends on the immersion time and the pH of the solution. Lowering the pH by adding concentrated nitric acid produces darker colours, while the opposite effect is obtained by adding caustic soda to the solution.

After immersion the process is completed

by rinsing the parts in cold running water and then in water not exceeding 70° C. for a period not greater than 30 secs. The parts are then dried slowly at a temperature not exceeding 90° C. When dry, the coating is hard enough to withstand mechanical damage.

An almost colourless coating with high corrosion resistance may be obtained by bleaching a coloured coating. This is achieved by immersion in water at 90° C. for about one minute.

Further details may be obtained from the Walterisation Co. Ltd., Purley Way, Croydon, Surrey.

Milling Machine

THE Archdale 30-in. production milling machine No. 14749 has a fully automatic table cycle and is of very rigid construction. The working surface of the table is 50 in. x 10½ in., the overall size 57 in. x 10½ in., and height above floor level 36 in.

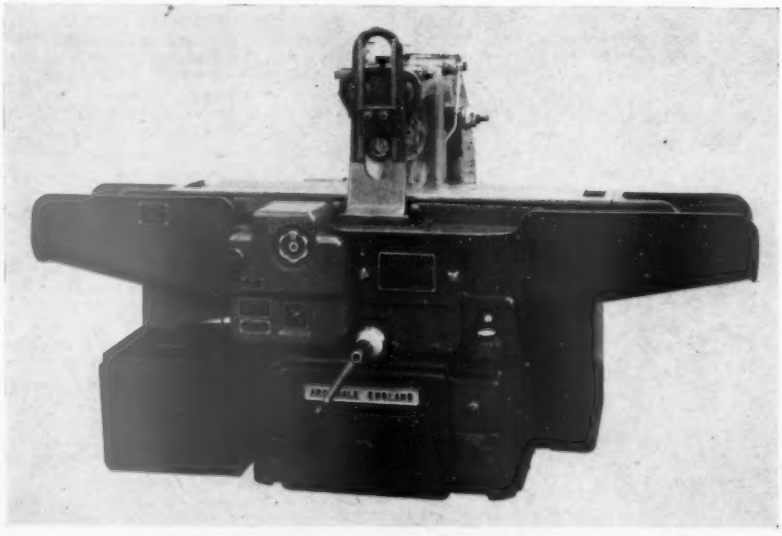
Fifteen spindle speeds are available in the low range, 25–317 r.p.m., and 15 speeds in the high range, 70–880 r.p.m. The standard spindle has a B.S. 1660 No. 40 taper; a No. 50 taper is available also. The spindle is carried in a sleeve having axial adjustment for cutter setting, and operated by helical rack and pinion. A 400/440-V. three-phase 50-cycle motor drives the spindle through multi-vee belts and hardened spur gears.

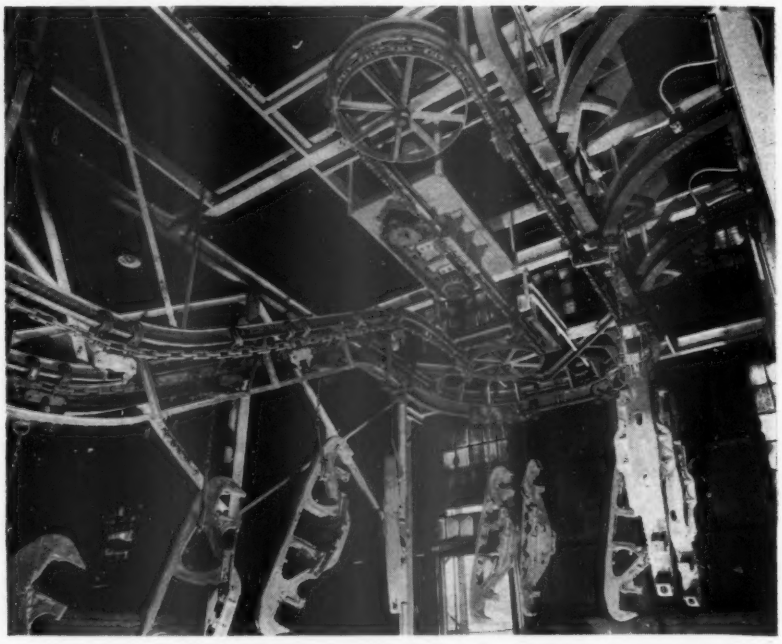
The table is driven by separate motors for quick traverse and feed, which are available in both directions. Hardened and ground screw and anti-backlash table nut allow climb-milling in both directions and are claimed to improve up-cutting conditions. Pendulum milling is also provided. The table feed motion is interlocked with the spindle drive, thus allowing the feed motor to be tripped if the spindle motor is seriously overloaded.

A continuous cycle can be provided by the addition of a counter box and alterations to the panel.

Oil pumps in the bed and the column supply lubrication, with a visible-flow indicator for the spindle drive. Twin overarms and an outer arbor support and brace are provided. The electrical control gear is built-in and ready for connection to the mains.

Further details may be obtained from the manufacturer, James Archdale & Co. Ltd., Ledsam Street, Birmingham, 16, or from the sole agent, Alfred Herbert Limited, Coventry.





Mechanical Handling of Castings

A LINK-BELT conveyor system installed at the foundry of the Scullin Steel Company of St. Louis, Missouri, U.S.A., assists in reducing production costs of steel castings, particularly bogie bolsters, side frames, and yokes for the railway industry.

The system consists of a combination of power-operated trolley conveyors and unpowered mono-rail type free conveyors. The free track, about 900 ft. long, connects all processing stations, and comprises two sets of trolley tracks alongside each other. The tracks are composed of I-beam sections suspended from steel beams mounted on columns.

After annealing, each casting is placed on a four-wheel trolley on the Link-Belt conveyor. The castings are pushed manually to a position where a power-operated pusher conveyor lifts them to the highest point in the system, 15 ft. above floor level. Thence the castings proceed by gravity to any one of four storage lines, selection being made by movable switches or points in the track system. The flexibility thus achieved in the storage facilities allows selective removal of castings to meet production requirements without interrupting the sequence of other operations.

A system of controlling the speeds of the heavy castings entering the storage area by gravity is installed. Each storage conveyor is equipped with a retarding chain conveyor running uniformly at 10 ft./min. and limiting the casting travel to that speed.

After cooling in the storage area the castings are moved by a power-operated conveyor to the shot-blasting receiving station where they are exactly positioned by limit switches for removal to the shot-blast chamber. From there the castings are transferred back to the conveyor by hoist, and manually pushed to a third powered conveyor which moves them to an unloading area. Here they are placed on stands to await removal by crane to the finishing department.

The empty trolleys return by the free track to either of two storage lines adjacent to the annealing furnace. Entry to the storage lines is controlled by limit switches which allow one line to be filled before incoming trolleys are diverted to the other line.

The flexibility of the system is increased by the installation of a recirculating conveyor which allows castings rejected after inspection to be returned for further cleaning or reprocessing.

Further details may be obtained from the Link-Belt Company, Prudential Plaza, Chicago, 1, Illinois, U.S.A.

Panel Warning Light

THE C.A.V. panel warning light type 328A-1 for all transport vehicles has a built-in dimming device which allows the driver to adjust the brilliance.

There are two polarising discs, one fixed, the other held in a rotatable bezel. Only light waves vibrating in a particular plane of polarisation pass through the fixed disc; these can pass through the second disc only if it is similarly aligned. When it is at 90 deg., no light will pass through except a small disc in the centre.

Further details may be obtained from C.A.V. Limited, Acton, London, W.3.

Electrification Conference Banquet

B.E.A.M.A. and L.A.M.A. entertain delegates at Guildhall

On Friday last the British Electrical & Allied Manufacturers' Association Incorporated and the Locomotive & Allied Manufacturers' Association of Great Britain were joint hosts at a banquet at Guildhall to the delegates to the British Railways Electrification Conference. Viscount Chandos of Aldershot, President of L.A.M.A., was in the chair, supported by Sir Leslie Gamage, President of B.E.A.M.A. The principal guests were the Lord Mayor of London, Sir Edmund Stockdale, and Mr. Reginald Maudling, M.P., President of the Board of Trade.

Lord Chandos proposed the toast of the Lord Mayor and Corporation of London and the Sheriffs, and the Lord Mayor in his response spoke of the value of international meetings between professional people to improve goodwill and to preserve mankind.

The President of the Board of Trade, in proposing the toast of international co-operation, said that this country had had long experience with railways which, indeed, it had given to the world and this applied particularly to the locomotive building industry. It was not difficult to speak in praise of the work that had been done to promote international co-operation. The alternative might be total destruction. The more people from overseas talked together on occasions such as the Conference that had taken place in this country, the better would be the chances of an understanding between nations. International trade was now of ever-increasing importance and modern trade needed most of all mass markets to achieve its maximum efficiency. He hoped that the six and seven groups of countries might get together and make it possible to sweep away a barrier to greater trade demands.

Under-developed Countries

There was a duty to the under-developed countries of the world to help them to catch up with the standard of living of the more industrialised nations. Not only money but technical assistance and technical training would be required, without which there could be no lasting benefit. The railway industry had really been the leader in opening up under-developed countries and this would have to continue in the future. Their technical achievements throughout the world had led the way in overcoming political barriers. The spirit of comradeship among railwaymen throughout the world had always been one of the great qualities of the profession. In the development of the less forward countries the railways would have to continue to play an important part. The opening up of new areas would have to depend largely on railways. The example which the railways had given in getting together should be a lesson to all on how they should co-operate. He hoped that the Electrification Conference would not only be fruitful in the exchange of knowledge but would also prove of assistance to British exporters.

Speaking of railway electrification at industrial frequency, he said that it was not always a disadvantage to go late into a field. It was possible to learn from others and even to benefit from the mistakes of others.

The President of the Board of Trade concluded by paying tribute to the work of U.K.R.A.S., and he was glad to know that the next President of U.I.C. would be a member of the British Transport Commission, Mr. John Ratter.

Monsieur P. Dargeou, Vice-President of the International Union of Railways and Director-General of the French National Railways, who responded, said that he would like to return thanks on behalf of the overseas delegates and pay a tribute to all those responsible for the Conference and for the hospitality all had received. Railways had done much to bring countries closer together and the Channel Tunnel studies, if they were made effective, would do much to advance this aim. The a.c. electrification system now adopted by British Railways had been developed in France under Louis Armand and would be a further means of bringing the railways of the two nations closer. The U.I.C. had a membership of 50 administrations and its aim was to experiment and test techniques with a view to passing them on for the benefit of any country. He was sure that Mr. Ratter would carry on the great work with confidence and skill. The results of the Conference would greatly please all friends of Britain.

Lord Chandos, in proposing the toast of railway modernisation, pointed out that the British Transport Commission was responsible for the largest network of railways anywhere in the world. The size and complexity of the modernisation problem was almost unique. This was a short-haul country and this involved its own problems. In his view the modernisation plan was really imaginative and covered all aspects of the industry. Air conditioning, for example, was not only a protection against heat and humidity but a great help in combating noise and dirt. Manufacturers in this country worked in the closest liaison with the B.T.C. British manufacturers had already played a leading part in the supply of equipment all over the world to a great variety of countries, and he would like everyone to know that British industry was willing to train any individual that overseas administrations might wish to send to this country.

Right Equipment Essential

Sir Brian Robertson, Chairman of the British Transport Commission, in the course of his reply said that, if the railways were to win the battle of intensive competition with other forms of transport at the present time, it was essential that they should have the right equipment. The modernisation plan did not attempt to do everything at once but to give first attention to traction. Therefore, visitors to this country could still see some out-of-date stations but these would be dealt with later. British Railways were in the closest touch with its suppliers in industry without whose help nothing like so much could have been achieved. He paid tribute to the assistance that had been given in the supply of materials and its development which he thought had been very good indeed.

Sir Leslie Gamage, President of B.E.A.M.A., in bidding the delegates "au revoir," said that he hoped that the guests would take back with them pleasant recollections of their visits to London, and much of interest that they had seen, and would be able to see, on the railways of this country and in the factories of the manufacturers. He was sure they would compare them favourably with anywhere else in the world.

Modernisation Progress Chart at Euston, L.M. Region

The chart shown in the illustration has been installed at Euston Station, London Midland Region, British Railways, to show at a glance, progress being made on major civil and electrical engineering modernisation schemes in the Region.

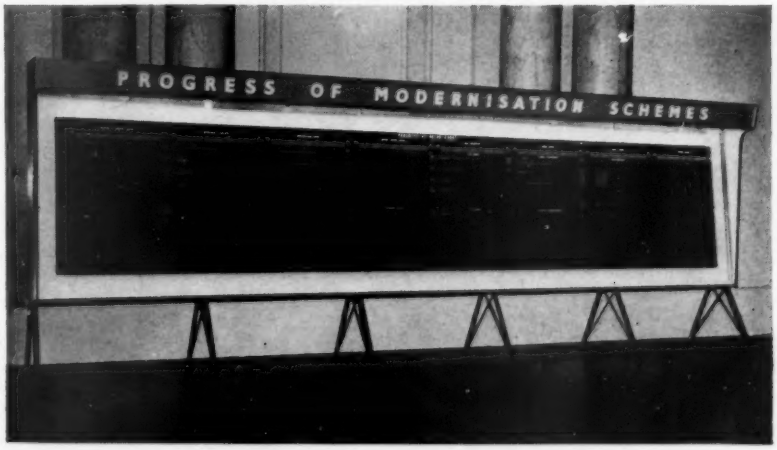
Each of eight perforated plastic panels covers a particular class of project, such as passenger stations and marshalling yards.

Departmental Operations

The system used is the Movigraph charting method. Three kinds of operation are part of each project: the works carried out by the Chief Civil Engineer, by the Chief Mechanical & Electrical Engineer, and by the Signal Engineer. Each of these operations, in each project, is denoted on the chart by a horizontal length of plastics strip, known as a "period bar." The colour of the bar indicates the kind of operation.

Each period bar is parallel with a date scale, which runs across the top of each panel. The length of a period bar, therefore, is in proportion to the amount of time estimated to complete the particular operation. Underneath each period bar is another bar, coloured red, showing the actual progress made for each operation.

Each classification panel covers a period of four years, divided into four-weekly units. The current date is shown by a vertical cursor line, and reference to this in relation to the "planned" and "actual" progress bars reveals which jobs are ahead or behind schedule.



Progress chart at Euston showing civil, mechanical and electrical engineering and signalling works in hand

Aluminium Plant Extended

First half of four-year expansion scheme completed at Rogerstone

Output capacity of the continuous strip mill at Rogerstone Works, near Newport, Monmouthshire, opened in 1950 by the Northern Aluminium Co. Ltd. (now Alcan Industries Limited), has been greatly increased by the entry into production of newly installed plant including a 144-in. Davy-United four-high hot mill, the largest and most powerful in operation in Europe for rolling aluminium. This can be used either as a breaking-down mill for the hot line, which extends for about one-third of a mile, or alone for rolling plate more than 11-ft. wide and down to ¼-in. thick. The maximum length of plate is 50 ft. Two 4,000-h.p. d.c. motors are linked to the top and bottom work-rolls which can be reversed quickly for each pass.

Less Welding Needed

Previously the largest mill at the works was a 96-in., which limited the width of plate, available to about 7 ft. The larger sizes should be of particular value in reducing the amount of welding needed during the manufacture of aluminium railway rolling stock, in which floor, roof, and end sections normally are about 8–9 ft. wide, and, more particularly, for shipbuilding purposes. Other industries which should gain greater freedom of design include those manufacturing chemical and petroleum plant.

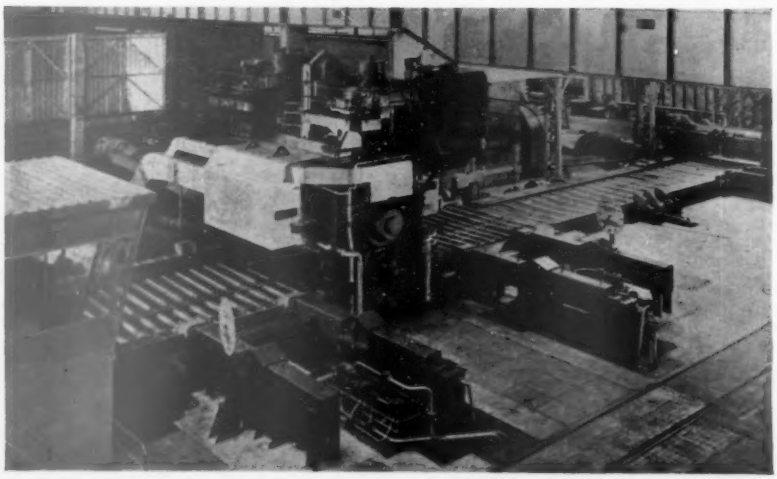
Commissioning of the new plant completes the first half of a four-year expansion scheme costing £8,000,000 to increase the output of rolled aluminium products at Rogerstone by 50 per cent to 75,000 tons a year. To mark the occasion a luncheon was held at the works attended by over 400 guests, including users and manufacturers of aluminium products in all sections of British industry. Field-Marshal Earl Alexander of Tunis, Chairman of Alcan Industries Limited, presided and introduced Mr. N. V. Davis, President of Aluminium Limited of Canada, who gave a short address.

Power to Handle Stronger Alloys

The plant, as it existed previously, was designed primarily for the rolling of strip in commercially-pure aluminium (Noral 2S) and 1¼ per cent manganese-alloy (Noral 3S), which are common alloys depending for their mechanical strength on work-hardening. In most of the new applications for plate, stronger alloys are required, the rolling of which calls for greater power than hitherto. This additional need has been taken into account without impairing the efficiency of large-scale production on common-alloy commodities such as building and container sheet, foil stock, and circles for holloware. A feature of Noral plate is that it can be supplied with edges sawn straight to very close limits thus saving edge-trimming by the user.

New Preheat Furnaces

Cast ingots, imported from the associated Aluminum Company of Canada, are preheated to 480—600°C. in four new pit-type furnaces in which they are protected from harmful products of combustion by an indirect system of oil firing. A Carruthers 8-ton crane extracts the ingots singly and places them on the roller table at the head of the hot line. Covering the 144-in. mill there is a 125/25-ton Vaughan crane. Other mills in the hot line are a 96-in. two-high Brightside, and three 88-in. four-high Robertson hot-finishing mills working together as a three-stand mill in tandem. Also there are Davy-United and Head-Wrightson slab shears, a coiling machine, and a Duros Weighprinter manufactured by Ashworth Ross & Co. Ltd.



General view of 144-in. four-high hot mill at Rogerstone, the largest in operation in Europe for rolling aluminium

Staff and Labour Matters

Railway Shopmen's Wages

At a meeting on October 7 between the Chairman of the B.T.C. and the Chairman and Joint Secretaries of the employees' side of the Railway Shopmen's National Council, various suggestions for resolving the present difficulties in regard to Railway Shopmen's wages were discussed. As a result of these discussions a meeting of the Railway Shopmen's National Council was convened on October 10.

Before the meeting of the Council, the employees' side had separate discussions at union headquarters and the meeting with the employer's side representatives did not take place until Monday evening.

After a long discussion, the Council finally reached agreement on the basis of an increase of 9s. 6d. a week for all skilled grades, with appropriate increases for semi-skilled and unskilled grades, also for women and apprentices, boys and youths, back-dated to January 11, 1960. This means that with the 5 per cent increase already granted from January 11, 1960, the skilled fitter this year will receive a total increase of 18s. 6d. a week.

As a result of the settlement the N.U.R. Executive agreed to call off the strike proposed for October 17.

Gloucester Railway Carriage & Wagon Co. Ltd.

Because they can no longer depend on the building of rolling stock as the chief business, the directors of the Gloucester Railway Carriage & Wagon Co. Ltd. have decided that other lines of manufacture must be found and developed.

The group net profit for the year ended May 31, 1960, was £143,403, compared with £206,952 for the preceding year. The board recommends payment of a final dividend at the rate of 8d. per 10s. unit, less tax. The total dividend is reduced from 15 per cent to 10 per cent for 1959-60.

General Sir William Morgan, Chairman of the company, points out in his annual statement that the chief reason for the poor results has been failure to obtain orders for rolling stock sufficient to keep the carriage and wagon works filled to more than a fraction of their capacity.

Lack of Orders in Home Markets

Since the railways in Britain were nationalised, he adds, the British Transport Commission and London Transport Executive have been practically the only customers in this country for rolling stock. The Commission is unique amongst nationalised industries in that it not only operates and maintains the railway system, but it also manufactures equipment for its own use. Its policy, so far as the manufacture of carriages and wagons is concerned, is to keep its own shops fully employed.

As a result, he states, the work recently offered to private firms has been far below the manufacturing capacity available in the country. "The ensuing scramble for the work offered has resulted in price-cutting competition and, in our case, the acceptance of work at uneconomic prices to avoid wholesale reduction in our labour force." A further consequence of the contraction of work for the home market is to handicap the firm's ability to compete successfully in overseas markets. Despite this, he maintains, it has secured some useful contracts abroad in the face of severe international competition.

The board has decided that it can depend no longer on the manufacture of rolling stock as its principal business; it must find and develop other lines of manufacture suited to the skills, equipment and accommodation available in its works.

Change of Policy

This major change of policy, Sir William Morgan emphasises, must have repercussions on the business. It will entail re-organisation of the works, purchase and installation of certain machine tools, and entry into new markets. It will take time to implement fully. During this period the profitability of the carriage and wagon works will be seriously affected both by orders which the firm has had to take at uneconomic prices and by this re-organisation. A severe drop in the earnings of the company must be expected this year.

Contracts and Tenders

Second contract for Mnyusi—Ruvu rail link, East African Railways

A second contract has been awarded for the East African Railways & Harbours rail link between Mnyusi and Ruvu. This one is to East African Enterprises Limited. The company will be constructing earthworks and culverts starting at the southern end of the line about 2½ miles west of Ruvu and ending about 10½ miles to the north. It is expected that work will start during October and will take about five months to complete. The first contract, which was awarded last month, was for work at the north end of the new link which starts about 2½ miles east of Mnyusi Station. The whole rail link which will cost £2,160,000 is planned to be in operation by mid 1962. The joining of the Central and Tanga lines means that, with the exception of the Southern Province Railway in Tanganyika, the whole East African Railway will be a complete unit. This will enable the free movement of wagons throughout Kenya, Tanganyika, and Uganda, to cope with the seasonal rushes of agricultural produce movements which occur at different times of the year in the three countries.

British Railways Eastern Region has placed the following contracts:

Adams & Mortimer Limited: improvements to stations at Witham, Marks Tey, and Hatfield Peverel

The Cleveland Bridge & Engineering Co. Ltd.: reconstruction of cross girders in central spans of underline bridge No. 213 over River Trent, between Sturton (closed) and Gainsborough Central

Eagre Construction Co. Ltd.: Construction of counterforts, provision of drainage and refacing of cutting slopes, between Caythorpe and Leadenham

Charles R. Price: construction of substations at Doncaster Wagon Works

Shellabear Limited: trimming of cutting slopes and provision of cess drainage 41m. 44ch. and 41m. 53ch, between Althorne and Burnham-on-Crouch

Sturvevant Engineering Co. Ltd.: supply, delivery, and installation of vacuum cleaning plant and compressed air pipework system at East Ham Carriage Servicing Depot

William Jones Limited: supply and delivery of two truck dischargers and track handling equipments for Connington and Parkeston tips.

British Railways, Western Region, has placed a contract with R. J. Leighfield & Sons, Ltd., for the construction of Swindon Motive Power Craft Apprentice School.

British Railways, Southern Region, has placed the following contracts:

Sir William Arrol & Co. Ltd.: repairs to outer dock gate, Dover Train Ferry Dock

Structural Waterproofers Limited: Waterproofing of bridges, Stewarts Lane and Blackfriars

Cleveland Bridge & Engineering Co. Ltd.: reconstruction of Queenstown Road Bridge, Battersea Park

C. & T. Painters Limited: station renovations, Porton and Idmiston Halt

R. Mansell Limited: new staff accommodation, Wimbledon

W. G. Beaumont & Son: renovations, Salisbury Motive Power Depot

J. W. Ellingham Limited: new staff accommodation, extension of electrification, Paddock Wood

Joseph Westwood & Co. Ltd.: reconstruction of Telham Hill Bridge, Battle

P. & M. Contractors Limited: station renovations, Farningham Road

Turnerised Roofing Co. Ltd.: repairs to goods shed, Brighton.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From Egypt:

Supply of high-speed luxury diesel trains.

The issuing authority is the Egyptian Republic Railways. Bids should be addressed to the Mechanical & Electrical Engineering Department, Cairo. The tender No. is 989. The closing date is January 16, 1961. The tender book is available at £E10. The Board of Trade reference is ESB/26424/60. No further information is available.

Supply of air-conditioned sleeping and dining cars.

The issuing authority is the Egyptian Republic Railways. Bids should be sent to the Mechanical & Electrical Engineering Department, Cairo. The tender No. is 951. The closing date is January 2, 1961. The tender book is available at £E10. The Board of Trade reference is ESB/26426/60. No further information is available at the Board of Trade.

Supply of diesel trains for suburban lines.

The issuing authority is the Egyptian Republic Railways. Bids should be sent to the Mechanical & Electrical Engineering Department, Cairo. The tender No. is 990. The closing date is January 9, 1961. The tender book is available at £E10. The Board of Trade reference is ESB/26425/60. No further information is available.

From Bolivia:

Dumpers and light and heavy road vehicles for constructional and other railway civil engineering work.

The issuing authority is the Comision Mixta Argentino-Boliviana, Edificio Smid, La Paz. The closing date is November 15. The Board of Trade reference is ESB/26025/60, but no further information is available in the Export Services Branch.

From Pakistan:

I. For the North Western Railway:
(1) 302,100 mild-steel bearing plates for (1,858·50 tons) 90-lb. R.B.S., F.F. rails
(2) 982,400 round spikes, 5⅞ x ¾ in. dia. (469·25 tons)
(3) 539,024 coach screws (245·45 tons)

II. For the Eastern Bengal Railway:
(1) 600,000 dog spikes (186·15 tons)
(2) 14,000 steel hook bolts (25 tons).

The issuing authority is the Deputy Director, Mechanical Engineering & Stores, Railway Board, Ministry of Railways & Communications, Government of Pakistan, Secretariat Building, Karachi, to whom bids should be sent, quoting Tender No. 60-S/1860/6/TP. The closing date is November 14. The Board of Trade reference is ESB/26103/60.

1 motor-driven bolt and tube screwing machine of modern design and construction with rigid die head arranged for screwing with accuracy from ½ in. dia. to 2 in. dia. bolts with tangential type chasers

1 motor-driven single head bolt and tube screwing machine of modern design and construction with rigid die head arranged for screwing with accuracy from ⅜ in. dia. to 1½ in. dia. bolt with tangential type chasers and guide screw feed control.

The issuing authority is the Chief Controller of Stores, North Western Railway, Empress Road, Lahore, from whom a complete set of tender documents can be obtained. The closing date is November 10, 1960. The Board of Trade reference is ESB/26409/60.

From Victoria:

13 oil circuit breakers of 22kV. for substations.

The issuing authority is the Secretary, Victorian Railways, Spencer Street, Melbourne, C.1, to whom bids should be sent, quoting contract No. 61785.

The closing date for this contract is November 16, 1960. The Board of Trade reference is ESB/25932/60.

From Iraq:

1,200,000 steel dog spikes ¾ in. x 6 in. length.

The issuing authority is the Director General, Iraqui Republican Railways Services, Baghdad, to whom bids should be sent. The tender No. is IRRS/R/3/60. The closing date is December 10, 1960. The Board of Trade reference is ESB/26461/60.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House), Theobald's Road, W.C.1).

Notes and News

Hydraulic Dampers in English Electric Co. Ltd. A. C. Locomotive.—In the description of the English Electric Co. Ltd. 3,300-h.p. a.c. locomotive in our September 23 issue reference was made to the use of hydraulic dampers. This equipment was supplied by Armstrong Patents Co. Ltd.

Rhodesia Railways C.T.C. Panel at Salisbury Station.—In our issue of September 30 we reproduced an illustration of Rhodesia Railways C.T.C. panel at Salisbury Station. This was stated in error to have been constructed by A.E.I.-G.R.S. Limited. The panel was built by Westinghouse Brake & Signal Co. Ltd.

Mount Isa Railway Scheme Contract.—Davis Contractors Pty., of Sydney, is a member of the international consortium which was recently awarded a £2,250,000 contract for Phase I of the Mount Isa Railway project in Queensland.

Metropolitan Railway Surplus Lands New Company.—The Metropolitan Railway Surplus Lands Co. Ltd. has taken a 50 per cent interest in Metrolands Investments, a new company formed to develop and hold investments in property mainly in the North of England. Authorised and issued capital will be £10,000 in £1 shares. Sir Bernard Docker, Chairman of Metropolitan Railway Surplus Lands, will be Chairman of the new company.

Paper on Diesel-Electric Operating Experience.—A paper entitled "The Operating Experience of the Diesel-Electric Train Sets on the Hastings Service" will be presented to the Institution of Locomotive Engineers

on October 18, by Mr. W. J. A. Sykes, Chief Mechanical & Electrical Engineer, British Railways, Southern Region. The meeting will be held at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m.

R.C.H.S. Visit to Victoria Station.—To mark the centenary of the opening of Victoria Station, London, which occurred on October 1, a visit was organised by the Railway & Canal Historical Society with the co-operation and assistance of the Southern Region, British Railways. A party of members and their friends was shown the organisation and equipment of the terminus. This visit was followed by an address by Mr. Charles E. Lee, who gave an account of the history of the station from its promotion by the Victoria Station & Pimlico Railway Company in 1858 until the present day.

Closure of London Midland Region Stations.—The following stations in the London Midland Region, British Railways, are to be closed on November 7: Haslingden, between Bury, Bolton Street, and Accrington, for passengers and parcels traffic; Middlewood Higher, between Macclesfield Central and Rosehill Marple, for all traffic; and Arley & Fillongley, between Nuneaton Abbey Street and Whitacre, for passenger and parcels traffic. Parcels and passenger train merchandise now handled at Haslingden, Middlewood Higher, and Arley & Fillongley will be dealt with at Rawtenstall Middlewood Lower, and Coventry respectively. Bus services operate in the areas concerned.

Lubricants Warehouse at Birmingham Curzon Street.—The Lubricants Distribution Service of Mobil Oil Co. Ltd. to customers within a 40 miles radius of Birmingham operates from a new warehouse at Curzon Street Goods Depot, Birmingham, in the London Midland Region, British Railways. The warehouse affords a monthly throughput of 4,000-4,500 barrels besides a complete range of products in small packages. Stocks are stored in specially designed racks and on pallets handled by mechanical equipment; 4,000-gal. storage tanks have been installed for Mobiloil grades, permitting filling of bulk delivery vehicles, churns, and other packages through pre-set meters. Bulk and packaged products are delivered to the warehouse by overnight train from the company's works at Birkenhead. Railway tank wagons are discharged by powered pumps, through meters.

Car Park Proposed over Railway Tracks.—No objection has been made by British Railways to a suggestion by Gravesend Council that a deck should be built over the track between Windmill Street and Parrock Street, Gravesend, to make a car park.

Underground Train Collision with Buffers.—On October 6 a train of the L.T.E. Northern Line collided with the buffers in a siding at Tooting Broadway Station on the underground section of the tube line. There were no passengers in the train, but the driver was trapped in his cab for more than 8 hr., and later taken to hospital. The first three coaches were badly damaged, and slight delays were caused to traffic until the wreckage was removed during the weekend.

Railway Staff Shortage Causes Coal Movement by Road.—Because of a shortage of certain grades of railway operating staff in the East Midlands, the British Transport Commission has arranged for some supplies of coal from pitheads to power stations to be conveyed by lorry. The movement is arranged with British Road Services. There is stated to be no shortage of railway wagons, but only of railway staff. British Railways is paid for the deliveries and in turn arranges payment to B.R.S.

Fluorescent Lighting in British Railways Sleeping Cars.—Fluorescent lighting is being used for the reading lights over the bunks in some two-berth second class sleeping cars of British Railways. The cars so fitted were built at Wolverton Works, London Midland Region. Lighting is by 9-in. 6-W. tubes in conjunction with transistorised ballast-converters produced by Philips Electrical Limited, which have already proved successful for fluorescent lighting in buses. The 9-in. tubes, in specially constructed 15-in. fittings, take the place of the small tungsten lamps usually used for reading lights in British Railways sleeping cars. Current supply is the 24-V. battery system. From this d.c. supply, the transistorised ballasts provide the higher-voltage a.c. needed for the tubes. Up to six tubes can be linked to each converter, and these are fitted on the underside of the carriage flooring. The tubes are mounted vertically on one side of the passenger's head, with the switch on the fitting. Tungsten lamps are still being used for the other lighting in the compartments and in the corridors.

Fluorescent lighting tubes, used in conjunction with transistor ballast converters, in British Railways sleeping car

Increase in Desoutter Machine Tool Exports.—A recent export shipment of multiple tools from the Hendon factory of Desoutter Bros. Ltd. included seven units for Czechoslovakia. Each year, since 1946, over half the output of Desoutter tools has gone overseas and export orders for the first nine months of 1960 already have exceeded last year's figure.

Crossley Bros. Ltd. Report.—Mr. H. D. Carter, chairman of Crossley Bros. Ltd., reports that the position in respect of the year to April 30, 1961, has greatly improved compared with the same period of last year. Orders for diesel engines have increased. Group trading profit fell sharply from £344,306 to £177,639 which, the chairman feels, represents a low point in the annual results. The net profit declined from £94,615 to £14,811, and the dividend has been cut by 7 per cent to 5 per cent.

Staveley Coal & Iron Dividend Increase.—The Staveley Coal & Iron Co. Ltd., is raising the dividend to 11 per cent, from the 10 per cent of the past two years. The final is 8 per cent against 7 per cent. Group profit, prior to tax, rose to £1,675,843 in the year ended June 30 from £1,349,881 in 1958-59. After tax of £850,875 (£743,077) and other deductions, the group profit attributable to members of the holding company and available for appropriation was £832,970 (£694,245). Subsidiaries retained £446,901 (£160,507).

Metropolitan Line in City Re-building Scheme.—The Corporation of the City of London is asking the B.T.C. to seek enabling powers in connection with covering or re-alignment of the L.T.E. Metropolitan Line between Moorgate and Aldersgate Street stations, in the Bill to be introduced in Parliament. The railway alterations are made necessary by the Barbican redevelopment scheme. Negotiations between the Corporation and London Transport Executive for re-alignment of the railway have made good progress, but it has not yet been possible to conclude heads of agree-

Lubricants warehouse at Birmingham Curzon Street Goods Depot, showing racks containing range of Mobil Oil Co. Ltd. products

ment; if such powers were not sought in the Bill a year would elapse before they could be sought by the B.T.C.

Railway Students' Association Presidential Address.—On October 19 at the inaugural meeting of the Railway Students' Association for the coming year, Mr. J. R. Hammond, General Manager, British Railways, Western Region, and President of the Association for the 1960-61 Session, will deliver his Presidential address. The retiring President, Mr. H. C. Johnson, General Manager, British Railways, Eastern Region, will preside.

Expanded Metal Co. Ltd. Orders Increase.—The internal accounts of the Expanded Metal Co. Ltd. for the period to mid-September indicate that both total orders received and orders despatched are up by about 14 per cent and that the trading profit before tax is approximately £290,000 compared with £220,000 for the same period last year. The increased margin of profit is due largely to improvements in efficiency and the elimination of unprofitable lines.

Railway Students' Association Visit to Kent Coast Electrified Area. — The Railway Students' Association has arranged a tour of the Southern Region Kent Coast electrified area on October 22. It will include visits to Canterbury West Control Room, the new bridge over the River Swale, the signalboxes at Sittingbourne and Faversham and the overhead equipment at one of those stations. The special train will leave Charing Cross at 9.10 a.m. and return to Victoria at 7.8 p.m.

Russian Welding Delegation to the United Kingdom.—A Russian Welding Delegation, led by Dr. B. E. Paton, Academician of the Ukrainian Academy of Sciences and Director of the Soviet Welding Institute, inspected welding works in many parts of Britain during a visit from September 16 to October 8. This was a reciprocal visit, following the delegation from the British welding industry to the U.S.S.R. in June. The exchange of visits was arranged by the British Electrical & Allied Manufacturers' Association.

Peterborough Railway Discussion Group.—A series of lectures and discussions on transport matters will be held every Wednesday until December 7 by the Peterborough Railway Discussion Group. At the first meeting on October 12 the speaker was Maj.-General G. N. Russell, Chairman of the Eastern Area Board of the British Transport Commission. The series will include talks on the Italian State Railways, railway architecture, and hazards in the railway industry. The meetings are being held at the Peterborough Technical College.

Microcell Electronic Recorder Shown at Electrification Exhibition.—An electronic recording device used by British Railways to help in checking the performance and efficiency of high-voltage a.c. electrification schemes and equipment, and associated signalling installations, was displayed at the British Railways Electrification Exhibition, Battersea Wharf. The device, known as the microcell electronic supervisor and digital recorder, provides information on an electrified system on a scale never possible before. The recorders are being installed in electric trains and locomotives and at points along test sections of electrified line, to record data such as the speed and position of trains, variations in electrical voltage and current consumption under varying load conditions, and the general effect throughout the power supply and in other related services. Recorders have been used to provide information about the electrification scheme between Colchester and Clacton.

Locomotive Engineers Meeting at Barrow-in-Furness.—On October 25-27 the Institution of Locomotive Engineers has arranged, at the joint invitation of Vickers-Armstrongs (Engineers) Limited and Sulzer Bros. (London) Ltd., a special meeting at Barrow-in-Furness. The meeting, which will include visits to the shipyard and engineering works at Barrow, is one of the events marking the Golden Jubilee Year of the Institution.

Automatic Signalling on the L.T.E. District Line.—Programme machines were introduced on the London Transport Executive District line last weekend. The installation at Parsons Green, on the Wimbledon branch, automatically signals a full day's train service in accordance with a punched hole code on a moving plastic roll. They also control trains entering and leaving Parsons Green depot.

Railway Track Blocked by Airliner.—The Eastern Region line from Liverpool Street to Southend was blocked between Rochfold and Southend on Sunday, October 9, when an airliner overshot the runway and fell on to the track. The train service between Rochford and Southend was cancelled for 9 hr. while the wreckage was removed, but a bus service was provided to carry passengers between the stations affected.

Children Emptied Ballast on Track.—Two 9 year-old boys and a boy and a girl both aged 10 who emptied the ballast from 11 hopper wagons on to the track near Bushbury, Staffs., London Midland Region, British Railways, were each fined £2 for obstructing the passage of a locomotive. Thirty-one men had to work for two days to clear the line, and the cost to the British Transport Commission is stated to have been £203. For smashing 126 light bulbs and many windows of seven passenger coaches, damage estimated at £98, each child was conditionally discharged for a year and ordered to pay £2 compensation, the maximum for a child under 14. They were also fined £1 each for trespassing.

Railway Students' Association Annual Convention.—The annual convention of the Railway Students' Association (the London School of Economics & Political Science) took place this year in Western Germany from September 26 to October 1 under the presidency of Mr. H. C. Johnson, General Manager of the Eastern Region of British Railways. Hanover was chosen as the convention centre, from which visits were paid to Brunswick, Bremen, Wolfsburg (for the Volkswagen works), and Goslar.

Southern and Western Regions Affected by Floods.—During the past two weeks extensive floods in the Devon area caused damage, delays and cancellations on the Southern and Western Regions of British Railways. The Southern Region has been the more seriously affected. Last week a bridge on the Exeter–Crediton line collapsed, the down line between Seaton Junction and Honiton was blocked by a landslide, and the train service west of Exeter was cancelled. Later in the week the single track between Eggesford and Lapford was seriously damaged, and there was a landslip between Coleford and Yeoford junction. Yeoford station was under water and there was more flooding on the line between Yeoford and Crediton. Because of flooding or landslips, no services were running between Exeter and Exford and Exeter and Bow, and, because of the state of the roads, buses could not take the place of the trains. The North Cornwall and Plymouth services, and North Devon ser-

Visual Warning on Electric Trains

Multiple-unit a.c. electric train on trial between Ware and Hertford East, British Railways, Eastern Region. An experimental yellow warning sign has been painted on the cab front to enable the train to be seen more easily by men working on the line

services to and from Barnstaple, Ilfracombe, and Torrington also were affected. The previous weekend, Teignmouth Station in the Western Region was flooded to platform level, and trains were cancelled for 2½ hr.

Forthcoming Meetings

October 17 (*Mon.*).—The Historical Model Railway Society, at Keen House, Calshot Street, London, N.1, at 7 p.m. "The (Little) North Western Railway"—Mr. A. W. H. Pearsall.

October 17 (*Mon.*).—Railway Correspondence & Travel Society, Merseyside Branch, at the Woodside Hotel, Birkenhead, at 7.30 p.m. "The Malayan Railways"—Mr. K. Rigby.

October 17 (*Mon.*).—Institute of Traffic Administration, Birmingham Branch, at the Cosmopolitan Club, Fore Street, Birmingham, at 7.15 p.m. "Traffic Engineering"—Mr. E. Davies.

October 18 (*Tue.*).—The Institution of Locomotive Engineers at Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. "The Operating Experience of the Diesel Electric Train Sets on the Hastings Service"—Mr. W. J. A. Sykes.

October 18 (*Tue.*).—Railway Correspondence & Travel Society, West Midlands Branch, at Alfred Herbert Art Gallery, Coventry, at 7.30 p.m. "North Staffs Recollections"—Dr. J. R. Hollick.

October 19 (*Wed.*).—Railway Students' Association, inaugural meeting, at London School of Economics, at 6.30 p.m. Presidential address by Mr. J. R. Hammond.

October 19 (*Wed.*).—Railway Correspondence & Travel Society, Lancashire Branch, at Douglas Hotel, Corporation Street, Manchester, at 7.30 p.m. "Transport Treasures"—Mr. J. H. Scholes.

October 19 (*Wed.*).—Peterborough Railway Discussion Group, at Peterborough Technical College, at 6.45 p.m. "Railways & Shipping"—speaker to be announced.

October 20 (*Thu.*).—British Railways, Western Region, Lecture & Debating Society, at Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington at 5.45 p.m. "Modernisation & Developments in the Signal Engineer's Department"—Mr. A. A. Cardani.

October 20 (*Thu.*).—Institution of Railway Signal Engineers, London Branch, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2. "Putney Line Programme Machines"—Mr. W. Woodhouse.

October 21 (*Fri.*).—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, London, N.W.1, at 7.15 p.m. "A Spanish Tour with no Siestas" (account of R.C.T.S. visit)—Mr. J. D. Blyth.

October 22 (*Sat.*).—The Permanent Way Institution, East Anglia Section, at Norwich, at 2.15 p.m. "Canadian Railways"—a film show.

October 22 (*Sat.*).—Railway Correspondence & Travel Society, Bristol Branch, at Grosvenor Hotel, Bristol 1, at 7.15 p.m. "Irish Railways" (illustrated)—Mr. K. Adams.

October 24 (*Mon.*).—The Permanent Way Institution, London Section, at Headquarters of British Transport Commission, Marylebone Road, London, N.W.1, at 6.30 p.m. "Preservation of Timber"—Mr. W. Rothwell.

October 25 (*Tue.*).—Retired Railway Officers' Society Annual Autumn Luncheon, at Hotel Russell, Russell Square, London, W.C.1.

October 25-27 (*Tue.*).—Institution of Locomotive Engineers, meeting at Barrow-in-Furness. Assembly of members at Old England Hotel, Bowness-on-Windermere, 7.30 p.m., October 25.

October 26 (*Wed.*).—Institute of Traffic Administration, Devon & Cornwall Branch, at S.W. Gas Board Theatre, Plymouth, at 7.15 p.m. "Passenger Transport"—Mr. A. W. Kirkwood.

October 27 (*Thu.*).—The Permanent Way Institution, Notts. & Derby Section, at Victoria Station Hotel, Nottingham, at 6.30 p.m. "Continuous Welded Rails"—Mr. E. Labrum.

Railway Stock Market

With sentiment helped by a better trend in international affairs, buyers were more in evidence in stock markets, and share prices responded readily. Improved demand has shown that many shares are in short supply the recent set-back in markets was due mainly to falling-off in buying, selling having been on moderate lines. Buying by unit trusts has emphasised that investment experts take an encouraging view of long-term prospects. Sentiment this week was also helped by renewed talk that the credit squeeze may be eased before long.

In foreign rails, the improvement in Antofagasta stocks continued under the influence of the preference dividend payment; the ordinary stock rose further on balance from 12½ to 13, while the preference at 33 compared with 32¼ a week ago. Costa Rica ordinary stock eased from 39 to 38½; the second debentures were 110xd.

United of Havana second income stock was again quoted at 6 and the consolidated stock at 1, while Brazil Rail bonds kept at 5½, Guayaquil & Quito assented bonds at 69½ and Paraguay Central prior debentures at 15. Sao Paulo Railway 3s. units, however, eased from 1s. 1½d. to 1s.

Mexican Central "A" bearer debentures at 58½ and Chilean Northern first debentures at 55½ had the same quotations as a week ago.

International of Central America common shares improved from $26½ to $28½ and the preferred stock from $102 to $106.

In other directions, Canadian Pacifics at $39¼ were at the same level as a week ago, while the preference stock improved from 60 to 61¼ and the 4 per cent debentures were fractionally better at 63½. White Pass shares eased from $11 to $10¾.

West of India Portuguese stock at 110½ and Barsi Light Railway at 17½ have been maintained. Nyasaland Railways shares (9s.) and the 3½ per cent debentures (45½) also kept steady, but quotations did not appear to be tested.

Among shares of locomotive builders and engineers, Birmingham Wagon were good at 33s. 9d., compared with 33s. 4½d. a week ago, while Charles Roberts 5s. shares rallied strongly from 8s. 6d. to 9s. 10½d. and Wagon Repairs 5s. shares at 19s. 3d. have more than held their recent good rise.

Elsewhere, G. D. Peters were quoted at 13s. 9d. and North British Locomotive at 9s. 9d. compared with 9s. 6d. a week ago. Gloucester Wagon 10s. shares declined from 11s. 6d. a week ago to 9s. 9d. following the chairman's annual statement, which emphasised (1) the difficulty of getting new orders owing to the policy of the British Transport Commission, and (2) the need to diversify the company's activities. Beyer Peacock 5s. shares have moved up from 7s. 4½d. to 7s. 10½d. Westinghouse Brake at 46s. were virtually unchanged on balance.

OFFICIAL NOTICES

A LARGE Steelworks in the Midlands area requires an assistant to the Railway Engineer to prepare and implement schemes for new track layouts, Diesel locomotive repair shops, etc. Opportunity for man age 24/35 to gain practical experience including routine maintenance. Minimum qualification O.N.C. and ability to prepare layout drawings. Pension scheme and staff canteen facilities available. Apply Box No. 57, RAILWAY GAZETTE, 33, Tothill Street, London, S.W.1.

STAFF VACANCY ON THE RAILWAY GAZETTE

APPLICATIONS are invited from men between 30 and 40 with a railway background and the ability to write clear and concise English for a progressive position on the editorial staff of *The Railway Gazette*. The successful applicant will receive intensive training in editorial matters and will be expected to apply himself very diligently to mastering the journalistic side of the job. A quick and retentive mind and a high regard for accuracy of presentation and interpretation of facts is essential. The position will appeal to a man with a disciplined mind, able to carry instructions into effect speedily, who is decisive, and who is not averse to working under pressure. Remuneration and progress will be related to the quality of the individual and for the right man will be attractive.

APPLICATIONS are invited from Engineering Draughtsmen to fill positions in a Company engaged in the manufacture of steel castings, forgings, engineering equipment, and railway trackwork. Applicants should have had drawing office and design experience in any of the above spheres, and should also possess technical qualifications of at least the Ordinary National Certificate in Mechanical Engineering. Five-day week, pension scheme, staff dining and welfare facilities available. Replies, stating age, experience and salary required, should be addressed to the Personnel Manager, Messrs. Hadfields, Ltd., East Hecla Works, Vulcan Road, Sheffield, 9.

Foreign Employment

ROADMASTER

ENGINEERING GRADUATE preferred; minimum of two years engineering training essential.

Require two years varied railroad engineering service, or five years in direct charge of track crews. Will supervise 135 men maintaining 45 mile railroad, assign work, order materials, be responsible for safety, make regular detailed inspections of roadbed and all track on main line, sidings and yards, bridges, tunnels, etc. Will make engineering calculations relating to maintenance and use of structure and equipment. Must speak Spanish. Married or single candidates acceptable.

Excellent opportunity large copper company, Chile, South America. Two year contract with transportation both ways for you and family. Basic salary $525.00 to $650.00 per month depending upon age and experience of applicant.

Box 6, The Railway Gazette, 33 Tothill Street, S.W.1.

RHODESIA RAILWAYS

Vacancies for Signal and Communications Technicians

APPLICATIONS are invited to fill vacancies in Rhodesia for Signal and Communications Technicians who are qualified in performing both signalling and telecommunications work, also applicants qualified to perform either mechanical or electrical work.

Single men between 25 and 35 years of age preferred, but married men within this age limit will be accepted provided they are prepared to travel to Rhodesia alone in the first instance.

Salary scale 62s. 6d. to 68s. per day.

Free passage, pension, good service conditions, including annual leave with pay, sick pay and good prospects of advancement.

Applications in writing should be addressed to: The London Agent, Rhodesia Railways, 241, Salisbury House, London Wall, London, E.C.2.

SOUTHERN Railway Association.—The thirteenth annual reunion luncheon of the Southern Railway Association was held at the Charing Cross Hotel on Tuesday, October 11, 1960, with Sir William Currie, Director of the former Southern Railway Company, presiding. Sir Philip Warter, Chairman of the Southern Area Board, British Transport Commission, and Mr. Charles Hopkins, General Manager of the Southern Region of British Railways, were the Association's guests.